

# Pathways to Prosperity

THE ECONOMIC IMPACT OF INVESTMENTS IN BICYCLE FACILITIES



## ***A Case Study of the North Carolina Northern Outer Banks***

*N.C. Department of Transportation Division of Bicycle and Pedestrian Transportation*



**Technical Report  
July 2004**



## **Technical Report**

# **The Economic Impact of Investments in Bicycle Facilities: A Case Study of the Northern Outer Banks**

**Produced for the  
North Carolina Department of Transportation  
Division of Bicycle and Pedestrian Transportation**

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# REPORT SUMMARY

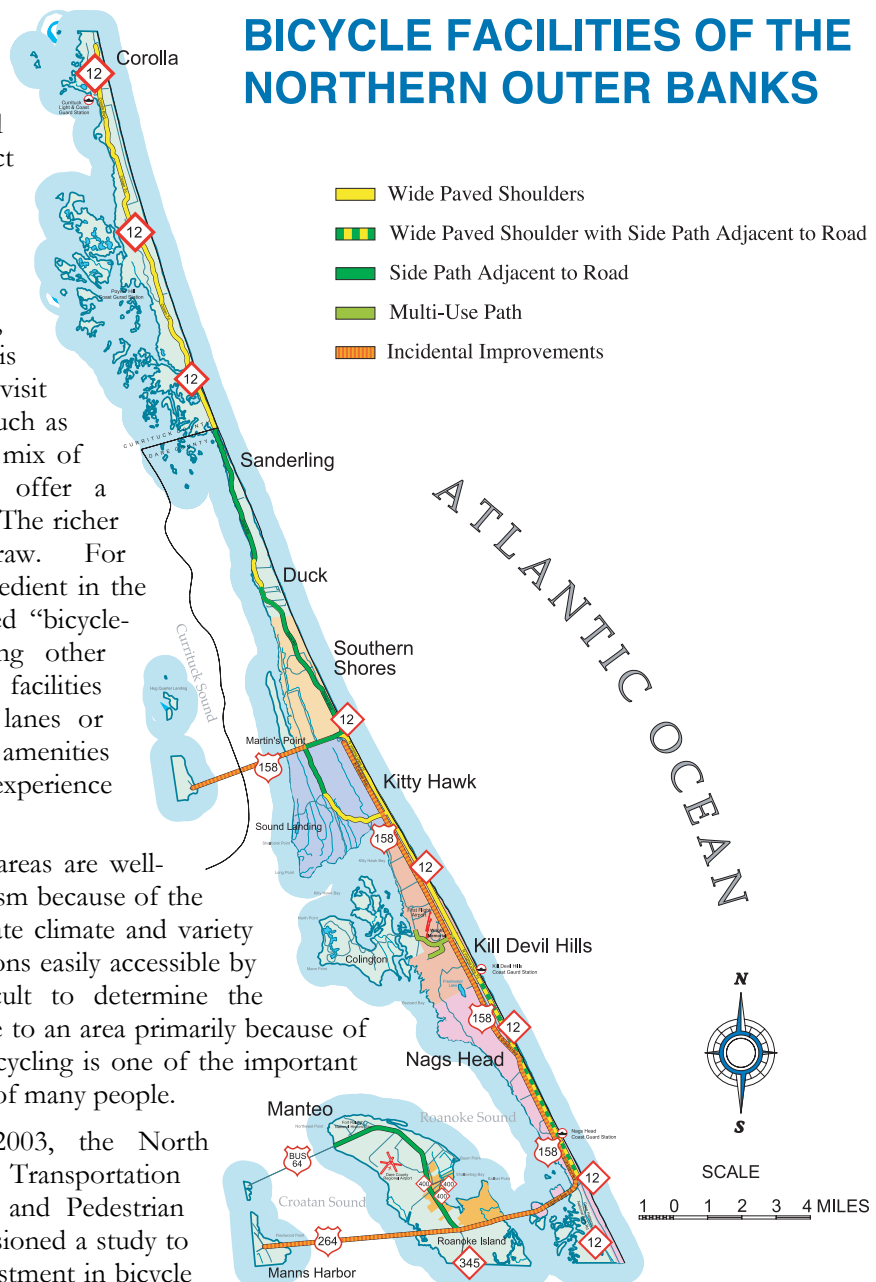
## THE ECONOMIC IMPACT OF INVESTMENTS IN BICYCLE FACILITIES: A CASE STUDY IN THE NORTHERN OUTER BANKS

### Bicycle Facilities Are a Significant Attraction for Tourists

Tourism is an important economic resource for North Carolina, as tourists spend money that benefits local economies. The economic impact of such expenditures is large and varied, and it benefits businesses, workers and local governments. Because of this favorable economic impact, competition for tourist dollars is strong. Tourists are drawn to visit an area by specific attractions, such as beaches, but also by a complex mix of activities and attractions that offer a variety of things to see and do. The richer the mix, the stronger the draw. For bicycling to be a significant ingredient in the mix, an area must be considered “bicycle-friendly.” This means, among other things, providing special bicycle facilities such as bicycle paths, bicycle lanes or wide paved shoulders, and other amenities that make the overall cycling experience convenient, pleasurable and safe.

North Carolina coastal areas are well-suited for attracting bicycle tourism because of the level terrain, year-round temperate climate and variety of natural and manmade attractions easily accessible by bicycle. Although it is difficult to determine the proportion of tourists who come to an area primarily because of bicycling, it is fair to say that bicycling is one of the important factors in the vacation decisions of many people.

In the summer of 2003, the North Carolina Department of Transportation (NCDOT) Division of Bicycle and Pedestrian Transportation (DBPT) commissioned a study to examine the value of public investment in bicycle facilities and determine the economic benefits accrued in the northern Outer Banks. This area was selected for the study because of existing high levels of bicycle activity and the presence of an extensive system of special bicycle facilities. A map of the study area appears to the right.



The study was conducted by the Institute for Transportation Research and Education (ITRE) at North Carolina State University. Researchers surveyed bicyclists riding on the bicycle facilities – paths and wide paved shoulders – and also obtained data from self-administered surveys of tourists at three visitors' centers in the region.

The study found that the economic impact of bicycling visitors is significant. A conservative estimate of the annual economic impact is \$60 million, with 1,400 jobs created/supported per year. This compares favorably to the estimated \$6.7 million of federal, state and local funds used to construct the special bicycle facilities in the area.

**Significant findings from the study include:**

- Seventeen percent of visitors to the area report bicycling activity while there; this is approximately 680,000 bicyclists annually.
- A conservative estimate of the annual economic impact of these bicyclists is \$60 million.
- The annual economic impact of cyclists is almost nine times as much as the one-time expenditure of public funds used to construct special bicycle facilities in the region.
- 1,400 jobs are created or supported annually with the expenditures made by bicyclists.
- Almost half of surveyed bicyclists earn more than \$100,000 annually and 87% earn more than \$50,000. Forty percent have a Masters or Doctoral degree and an additional 38% reported completion of a college degree.
- The quality of bicycling in the region had a positive impact on respondents' vacation planning with 43% reporting that bicycling was an important factor in their decision to come to the area, 53% reported bicycling as a strong influence in their decision to return in the future, and 12% reported staying three to four days longer to bicycle in the area.
- Nearly two-thirds of respondents indicated that riding on bicycle facilities made them feel safer.
- Over three-fourths of all survey respondents indicated that additional bicycle paths, paved shoulders and bike lanes should be built.
- Nine out of ten survey respondents strongly agreed that state and/or federal tax dollars should be used to build more bicycle facilities.

## **Ten Years of Public Investment in Bicycle Facilities**

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The northern Outer Banks region of coastal North Carolina is a natural attraction for bicyclists. Looking at a map, the long, thin ribbon of land conjures images of sun and sea that are almost irresistible to those who like to travel on two wheels. In 1974, a group of Dare County citizens and decision-makers, who understood that appeal, initiated an effort to improve conditions for bicycling. They approached the North Carolina Department of Transportation for assistance; however, at that time, there were neither state nor federal funds available to construct bicycle facilities. It was not until the late 1980's, when NCDOT funding was first earmarked for construction of bicycle facilities, that the Bicycle Program (now the Division of Bicycle and Pedestrian Transportation) could begin to plan, fund, design and build bicycle improvements in the region. NCDOT first allocated dedicated Transportation Improvement Program (TIP) funds to construct Independent Bicycle Facilities (built independently of highway projects) and Incidental Bicycle Facilities (constructed through a scheduled highway project) in 1987.



Over the past ten years, 31 miles of on-road facilities like wide paved shoulders, wide curb lanes, and marked bike lanes and 24.75 miles of off-road facilities like greenway trails, side paths and multi-use paths have formed an extensive bicycle transportation system linking towns and villages in the northern Outer Banks from Corolla south to Nags Head and west to Manteo. To date, approximately \$5.9 million Bicycle TIP funds have been allocated for these facilities. The towns of Nags Head and Duck and the Dare County Tourist Bureau also contributed approximately \$800,000 toward construction costs bringing the total public investment to approximately \$6.7 million. In addition, NCDOT has incorporated other improvements, such as bicycle-safe accommodations on bridges and additional width on roadways, into scheduled highway projects. In some areas, developers have used private funds to build bicycle facilities as well. Combined, these improvements have made bicycling a viable transportation option in the region and have enhanced bicycle recreation opportunities.

## **The Benefits of Investing in Bicycle Facilities**

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There are both specific economic benefits and other less tangible benefits of public investments in bicycle facilities:

- **Economic Benefits** – particularly in the case of bicycling travelers, increased retail sales (restaurants, lodging establishments, and retail stores), job preservation and creation; reduced health care costs resulting from healthier living; and, in the case of dedicated bike paths or trails, enhancement of nearby property values.
- **Benefits to the Transportation System** - less traffic congestion, improved safety (minimized conflicts between motorists, bicyclists or pedestrians), and preservation of highway infrastructure (e.g., paved shoulders resulting in less damage at the edge of the vehicle lanes).
- **Environmental Benefits** - improved air quality and energy conservation.
- **Benefits to Health and Fitness** – increased opportunity for more active lifestyles; promotes safe places to exercise, particularly for seniors; increased physical and mental well-being.
- **Social Benefits** – increased quality-of-life due to more open space and greenways, increased opportunities for walking or cycling, and increased connectivity within a community.

Many of these benefits are very hard to quantify or translate into dollar terms. However, it is possible to measure the effect investing in an amenity has in attracting visitors or tourists to an area through an Economic Impact Analysis. This is the premise upon which this study was designed.

## **Measuring Bicycle Usage and Characteristics**

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The basic intention of an Economic Impact Analysis is to examine the economic activity generated by visitors or tourists that are drawn to an area by a particular attraction or facility. When tourists visit an area, they spend money, and these expenditures benefit the local economy. A particular challenge in this case study was that tourists obviously come to the Outer Banks for a variety of reasons, most of which may have little or nothing to do with bicycling. Although they may do some bicycling while in the area, for most tourists this is not the primary reason for visiting the Outer Banks. Moreover, even if bicycling was an important factor in their decision to visit the area, was it the overall quality of bicycling in the area or was it the availability of specific bicycling amenities such as wide paved shoulders or multi-use paths?

To try to resolve these questions, a variety of surveys and bicycle traffic counts were conducted in the area. The northern Outer Banks region was chosen for this study because of known bicycling in the area and the presence of a system of bicycle facilities. The surveys and counts were as follows:

- **Intercept surveys** were conducted, over a period of 2½ days, by interviewers who stopped bicyclists riding by three survey locations. Questions were intended to develop a “profile” of bicyclists and their perceptions of the quality of cycling in the area. The cyclists surveyed were both visitors and residents. A limited number of these surveys were also made available at two local bike shops. (These cyclists are generally referred to as either *Intercepted Visitor Cyclists*, or *Intercepted Resident Cyclists*.)
- **Self-administered surveys** aimed at general visitors (cycling and non-cycling) were made available at three visitor centers in the area, primarily to find out what proportion of respondents engaged in some bicycling activity while in the area. Surveys were collected on-site, or mailed back over a six-week period. (These people are generally referred to as either *Visitor Center Cyclists*, or *Visitor Center Non-cyclists*.)
- **Mail-back surveys** were sent to the owners or managers of Bed and Breakfast and campground establishments, and also made available to their guests.
- **Pneumatic tube counters** were placed on bicycle facilities at eleven locations (off-road paths and wide paved shoulders) to physically count users of the facilities over a period of one week.

These efforts provided valuable information about the amount and nature of bicycling activity in the area. Included was information about how long people stayed, where and how often they bicycled, and how much and on what they spent money. These data provided the total number of tourists visiting the northern Outer Banks annually, the proportion of these tourists that were influenced to visit by bicycling, and the average amount spent per day by each visitor.

## Highlights from the Surveys

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Bicyclists who completed the surveys were relatively affluent and well-educated; most held advanced degrees (81 percent of Intercepted Visitor Cyclists, 66 percent of Visitor Center Respondents) and at least half reported household incomes of \$75,000 or more (78 percent of Intercepted Visitor Cyclists, 50 percent of Visitor Center Respondents). This may correlate to the average age of both response groups, which was in the mid to late 40's. Interestingly, more males filled out the Intercepted Visitor Cyclist survey, while more females returned the Visitor Center survey. In general, tourists tended to come from mid-Atlantic and northeastern states, specifically Virginia, Pennsylvania, Maryland and New York. The average Intercepted Visitor Cyclist has intermediate level cycling skills and normally rides ten to 49 miles per month. While at the northern Outer Banks he/she rode about 14 miles a day on each of five days. Visitor Center Cyclists are also, on average, intermediate skill level cyclists, but they typically rides less than ten miles per month.

The Visitor Center surveys revealed that about 17 percent of tourists, or about 680,000 people annually, engage in some bicycling activity while in the area. Approximately one-third of these bicyclists indicated that it was an important factor in their decision to visit. The quality of bicycling in the area was rated fairly highly by Visitor Center Cyclists, as was the quality of bicycle facilities. Scoring even higher was the perception that the bicycle facilities added to the cyclists' feeling of safety while riding. Finally, many Visitor Center Cyclists indicated that the quality of bicycling would be important in their decision to return to the area.

Another factor that indicates that bicycling is important in terms of visiting the area is that 70 percent of the Intercepted Visitor Cyclists and 62 percent of the Visitor Center Cyclists stated that they



had brought their own bikes. Seventy-five percent of the Intercepted Visitor Cyclists bicycled more than half the days of their visit, with the average cyclist cycling 69 percent of the days of his or her trip. Finally, eleven percent of the Intercepted Visitor Cyclists and 16 percent of the Visitor Center Cyclists stated that their visit duration was extended due to bicycling, by an average of three and four days, respectively.

Interestingly, a higher percentage of both Intercepted and Visitor Center Cyclists said that bicycling would be more important to their decision to return to the area than it was in their decision to come. This suggests that once exposed to the quality of bicycling in the area, visitors are more likely to return.

It should also be recognized that bicycling is important not just for the tourists. Many residents also benefit by the presence of the bicycle facilities and use them for purposes of exercise (46%), recreation (32%), and personal errands (11%). Four percent of residents indicated that their bicycle trip was for the purpose of commuting to work or school.

A large percentage of bicyclists indicated that additional facilities should be built in the area - 76 percent of intercept respondents, 70 percent of Visitor Center Cyclists, and 92 percent of resident cyclists. An overwhelming proportion favored the use of state and/or federal funds to build such facilities - 95, 88 and 100 percent, respectively.

## Analyzing Economic Impact

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There are two main types of benefits that result from the presence of bicycle facilities in an area. Each of these has some economic value (i.e., people would be willing to pay something in order to obtain these benefits).

- The **benefits to local residents** who use the bicycle facilities for recreation, exercise, commuting, etc. There may also be some benefits from less traffic congestion, increased bicycle and pedestrian safety, and improved air quality.
- The **benefits that result from tourists** drawn to the area due to the bicycle facilities. The tourists spend money that benefits the local economy.

An Economic Impact Analysis (EIA) presumes that the main benefit that occurs from an investment is in attracting visitors or tourists from other areas. For example, a tourist attraction such as the Wright Brothers National Memorial attracts many visitors from across the country. These tourists spend money on food, lodging and a variety of other things while visiting, and this has a direct economic impact on the local restaurants, lodging facilities, and retail merchants. Moreover, these expenditures result in increased public revenues through sales and other local taxes.

Often it is not too difficult to develop an estimate of how many tourists come to an area because of a particular attraction or event; however, there are a number of reasons to visit the Outer Banks - the obvious ones being beach- or ocean-related, not bicycle-related. Even if tourists come for the purpose of bicycling, are they attracted by the overall quality of bicycling in the area (e.g., flat terrain, scenic views, and temperate climate), or by the quality of the bicycle facilities that are available (wide paved shoulders, multi-use paths, etc.)? The answer is probably not one or the other but some combination of both factors. No matter how scenic or flat, bicyclists are not likely to be attracted to an area where the bicycling is difficult or unsafe.

In order to deal with these issues, several questions were included in the surveys that were designed to help determine the extent to which bicycling in general, and bicycle facilities in particular, were important to the decision to visit the area. This information was used to help assess the degree to which it could reasonably be argued that some of the economic benefits accruing from the tourists are attributed to bicycling, or to bicycle facilities.

Because of the uncertainties mentioned above, and the inherent difficulty of developing a precise estimate in this kind of analysis, a range of estimates was developed to evaluate the number of bicyclists for whom it could reasonably be argued that they were strongly attracted to the Outer Banks by bicycling. An assumption was made based on state and local tourism information that at least four million tourists visit the northern Outer Banks each year. High, mid-range and low estimates shown below were developed as follows:

- **High Estimate**

Seventeen percent of tourists responding to the Visitor Center survey indicated that they bicycled while in the area, which translates to about 680,000 annual tourists (based on four million tourists total) who do some bicycling while there. This number was reduced to 102,000 based on the percentage of respondents that indicated that bicycling was *very important in their decision to come* to the area. This was intended to reflect the fact that most tourists did not come to the northern Outer Banks primarily to bicycle.

- **Mid-range Estimate**

For a more conservative mid-range estimate, the high estimate was reduced by the percentage of respondents who also gave a high rating to the *overall quality of bicycling facilities* in the area. This reduced the number of pertinent annual cyclists to 40,800.

- **Low Estimate**

To provide a lower boundary, the mid-range estimate was further narrowed by the percentage of the respondents who also gave a high rating to the importance of bicycling in *their decision to return* to the area. This reduced the number to 10,200 pertinent annual cyclists.

To generate an annual expenditure figure, the estimated number of cyclists was multiplied by the average trip expenditures and then fed into an economic impact computer model (IMPLAN) that estimates both the dollar impact and the number of jobs created by this economic activity. This is summarized below.

Estimate	Estimated Number of Riders Annually	Annual Economic Impact	Number of Jobs Supported Annually
High Estimate	102,000	\$149 Million	3,517
Mid-range Estimate	40,800	\$60 Million	1,407
Low Estimate	10,200	\$15 Million	352

The mid-range annual economic impact estimate of \$60 million generated and 1,400 jobs supported was selected as a conservative outcome of benefits to compare with the costs incurred by NCDOT and the local municipalities to construct the dedicated bicycle facilities in the northern Outer Banks. The estimated \$6.7 million expenditure of public funds over the last ten years yields a return *each year* that is approximately nine times the initial investment. If the additional \$2 million spent on bicycle improvements built as part of a highway or bridge project is added, the return on the investment is still very high with a sevenfold return each year.

## Recommendations

The investment in bicycle facilities in the northern Outer Banks has resulted in a very favorable economic return for the area. Continued investment could only be expected to increase this favorable

impact and is therefore recommended. In addition, if North Carolina is to stay competitive for bicyclists with other nearby coastal states, a failure to continue investing in such facilities could prove to be harmful in the long run.

The types of bicycle facility investments identified as most desirable through this study are:

- More and/or wider bicycle paths and lanes.
- More and/or wider paved shoulders on roads.

In addition, this study recommends that NCDOT and local municipal governments:

- Pursue opportunities to create linkages between existing bicycle facilities where possible.
- Develop more bicycle lanes or paved shoulders on side streets away from the beach.
- Upgrade existing bicycle facilities where necessary to meet federal AASHTO (American Association of State Highway and Transportation Officials) standards and build new facilities to these standards.
- Increase efforts to promote the use of the bicycle facilities in the area.

This study also suggests that public investments in bicycle facilities in other coastal or resort areas could return similar benefits - whether the area attracts tourists primarily for bicycling or for other reasons.



## Table of Contents

<b>Report Summary The Economic Impact of Investments in Bicycle Facilities: A Case Study in the Northern Outer Banks .....</b>	<b>v</b>
Bicycle Facilities Are a Significant Attraction for Tourists .....	v
Ten Years of Public Investment in Bicycle Facilities .....	vi
The Benefits of Investing in Bicycle Facilities .....	vii
Measuring Bicycle Usage and Characteristics.....	vii
Highlights from the Surveys .....	viii
Analyzing Economic Impact .....	ix
Recommendations.....	x
<b>I. Introduction .....</b>	<b>1</b>
<b>II. Literature Review.....</b>	<b>3</b>
Introduction .....	3
North Carolina Tourism.....	3
Bicycling Literature .....	6
The Characteristics of Bicyclists.....	6
What Attracts Bicyclists to a Particular Area? .....	7
The Benefits of Bicycling.....	9
Economic Impacts.....	9
References .....	10
Bibliography .....	11
<b>III. Bicycling in the Northern Outer Banks.....</b>	<b>13</b>
Ten Years of Bicycle Improvements .....	13
A System of Bicycle Facilities Encourage Usage and Improve Safety .....	14
NC 12 from Corolla to Dare County Line .....	15
Duck Trail along NC 12 .....	15
Southern Shores Side Path along NC 12 and US 158.....	15
NC 12 from Kitty Hawk to Whalebone Junction .....	15
Woods Road Bike Path in Kitty Hawk.....	15
Kitty Hawk Road (SR 1206) in Kitty Hawk .....	15
Kill Devil Hills Bicycle Improvements.....	16
Nags Head Side Path along NC 12.....	16
Manteo Side Path along US 64/264 .....	16
<b>IV. Study Results – Survey Outcomes .....</b>	<b>17</b>
Intercept Survey Respondents.....	18
Demographics .....	18
Bicyclists’ Characteristics .....	20
Importance of Bicycling.....	21
Trip Information.....	22
Attitudes about Bicycle Facilities and Investments .....	23
Investment Priorities .....	24
Spending Patterns .....	24
Visitor Center Respondents - General Tourists .....	25
Demographics .....	25
Bicyclist Characteristics.....	28
Importance of Bicycling.....	29
Attitudes about Bicycle Facilities and Investments .....	30
Investment Priorities .....	31

Spending Patterns .....	31
Bed & Breakfast and Campground Owners Survey.....	32
Bicycle Traffic Counts .....	32
<b>V. Study Results - Economic Impact Analysis.....</b>	<b>37</b>
<b>VI. Conclusions and Recommendations.....</b>	<b>41</b>
Conclusions .....	41
Recommendations.....	44
<b>VII. Appendix A: Map details of Study Area.....</b>	<b>45</b>
<b>VIII. Appendix B: Methodology .....</b>	<b>49</b>
Intercepted Visitor and Resident Cyclists.....	49
Visitor Center Tourists .....	50
Bed and Breakfasts Accommodations and Campgrounds.....	51
Traffic Counts.....	51
<b>IX. Appendix C: Intercepted Visitor Cyclists: Cycling Demographics by Skill Level....</b>	<b>53</b>
Ratings by Question and Skill Level .....	53
Beginner/Novice Skill Level: (12 respondents) .....	58
Intermediate Skill Level: (105 respondents) .....	58
Advanced Skill Level: (26 respondents) .....	58
<b>X. Appendix D: Intercept Survey of Local Residents .....</b>	<b>59</b>
Demographics.....	59
Bicyclists' Characteristics.....	59
Trip Information .....	60
Bicycle Facilities Investments .....	60
Facility Investment Locations .....	60
<b>XI. Appendix E: Survey of Bed and Breakfast and Campground Establishments .....</b>	<b>61</b>
Bed & Breakfast Services .....	61
Bed & Breakfast Ratings .....	61
<b>XII. Appendix F: Priorities for Bicycle Facility Improvements.....</b>	<b>63</b>
<b>XIII. Appendix G: Survey Questionnaires .....</b>	<b>67</b>



## List of Tables

Table 1. Comparison of first-time and regular visitors' priorities of recreation at the Outer Banks. ....	5
Table 2. Travel expenses for visitors to the Outer Banks.....	6
Table 3. Northern Outer Banks Bicycle Facilities, with corresponding cost to construct, length and year installed.....	14
Table 4. Respondent types and total surveys collected from each type. ....	17
Table 5. Intercepted Visitor Cyclists: list of expenditures per visitor per day. ....	24
Table 6. Visitor Center Cyclists: list of expenditures per visitor per day. ....	31
Table 7. Estimated annual expenditures for bicycling tourists on the northern Outer Banks, based on survey data.....	38
Table 8. Varying estimates for numbers of riders, jobs created and/or supported, and the overall economic impact, annually, based on conservative to high ranges. ....	39
Table 9. Comparison of the quality of bicycling, facilities, and feeling of safety across three respondent categories.....	42
Table 10. Comparison of bicycle facility investment priorities among the three respondent categories.....	43
Table 11. Intercept survey: Total number of visitor cyclists or resident cyclists polled at key locations. ....	50
Table 12. Number of counters and their locations.....	51
Table 13. Intercepted Visitor Cyclists: Comparison among skill level for ratings by question and demographic results.....	53
Table 14. Intercepted Resident Cyclists: average ratings for quality of cycling and facilities and feeling of safety in the area. ....	59
Table 15. Intercepted Visitor Cyclists: ranked priorities selected for bicycle improvements in the area. ....	64
Table 16. Visitor Center Cyclists: ranked priorities selected for bicycle improvements in the area. ....	65
Table 17. Visitor Center Respondents (Cyclists and Non-cyclists): ranked priorities selected for bicycle improvements in the area. ....	65
Table 18. Intercepted Resident Cyclists: ranked priorities selected for bicycle improvements in the area. ....	66

## List of Figures

Figure 1. Intercepted Visitor Cyclists: top five states of origin. ....	18
Figure 2. Intercepted Visitor Cyclists: household income. ....	19
Figure 3. Intercepted Visitor Cyclists: education levels. ....	19
Figure 4. Intercepted Visitor Cyclists: bicycling skill ratings. ....	20
Figure 5. Intercepted Visitor Cyclists: miles per month ridden. ....	20
Figure 6. Intercepted Visitor Cyclists: importance of biking in decision to come to northern Outer Banks. ....	21
Figure 7. Intercepted Visitor Cyclists: importance of bicycling in decision to return to the area. ....	21
Figure 8. Intercepted Visitor Cyclists: feeling of safety due to bicycle facilities. ....	22
Figure 9. Intercepted Visitor Cyclists: quality of bicycling in the area. ....	23
Figure 10. Intercepted Visitor Cyclists: quality of bicycle facilities in the area. ....	24
Figure 11. Visitor Center Respondents: top five states of origin. ....	26
Figure 12. Visitor Center Respondents: household income. ....	26
Figure 13. Visitor Center Respondents: education level. ....	27
Figure 14. Visitor Center Cyclists: bicycling skill ratings. ....	28
Figure 15. Visitor Center Cyclists: miles per month ridden. ....	28
Figure 16. Visitor Center Cyclists: importance of bicycling in decision to come to northern Outer Banks. ....	29
Figure 17. Visitor Center Cyclists: importance of bicycling in decision to return to the area. ....	29
Figure 18. Visitor Center Cyclists: feeling of safety due to bicycle facilities. ....	30
Figure 19. Visitor Center Cyclists: quality of bicycling in the area. ....	30
Figure 20. Visitor Center Cyclists: quality of bicycle facilities in the area. ....	31
Figure 21. Bicycle traffic counts: average count per day by counter location. ....	33
Figure 22. Bicycle traffic count: average count per day by town. ....	33
Figure 23. Bicycle traffic counts: total counts per hour of day (peak usage times). ....	34
Figure 24. Bicycle traffic counts: total counts per day. ....	34
Figure 25. Bicycle facilities of the northern Outer Banks, from Corolla to Duck. ....	45
Figure 26. Bicycle facilities of the northern Outer Banks from Southern Shores to Kill Devil Hills. ....	46
Figure 27. Bicycle facilities of the northern Outer Banks from Nags Head to Manteo. ....	47
Figure 28. Intercepted Visitor Cyclists, by skill level: household incomes ....	55
Figure 29. Intercepted Visitor Cyclists, by skill level: education level ....	55
Figure 30. Intercepted Visitor Cyclists, by skill level: importance of bicycling in decision to come to northern Outer Banks. ....	56
Figure 31. Intercepted Visitor Cyclists, by skill level: rating of quality of bicycle facilities ....	56
Figure 32. Intercepted Visitor Cyclists, by skill level: rating of feeling of safety on bicycle facilities in the area ....	57
Figure 33. Intercepted Visitor Cyclists, by skill level: importance of bicycling in decision to return to the area. ....	57

Figure 34. Visitor Center Survey. ....	68
Figure 35. Intercepted Visitor Cyclist Survey. ....	71
Figure 36. Intercepted Resident Survey.....	74
Figure 37. Bed and Breakfast/Campground Establishment Survey .....	76



## I. INTRODUCTION

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In the summer of 2003, the North Carolina Department of Transportation (NCDOT) Division of Bicycle and Pedestrian Transportation (DBPT) commissioned a study to examine the value of public investment in bicycle facilities. The northern Outer Banks region was selected for a case study because of existing high levels of bicycling activity in the area and the presence of an extensive system of special bicycle facilities funded and built by NCDOT and local municipal governments.

To determine the value of public investment in bicycle facilities in this area, an economic impact study was designed and conducted by the Institute for Transportation Research and Education (ITRE) at North Carolina State University. Information was gathered by researchers who surveyed bicyclists riding on the local bicycle facilities, including off-road and multi-use side paths and wide paved shoulders. Additional data were obtained from general tourists at three visitor centers in the region who completed self-administered surveys.

The basic intention of an economic impact study of this type is to examine the economic activity generated by visitors or tourists that are drawn to an area by a particular attraction or facility. When these tourists visit an area they spend money, and these expenditures benefit the local economy. A particular challenge in this case study was that tourists obviously come to the Outer Banks for a variety of reasons, most of which may have little to do with bicycling. Although they may do some bicycling while in the area, for most tourists this is not the primary reason for visiting the Outer Banks. Moreover, even if bicycling were an important factor in their decision to visit the area, was it the overall quality of bicycling in the area (e.g., the flat terrain, scenic views and generally temperate climate), or was it the availability of specific bicycling amenities such as wide paved shoulders or multi-use paths? If the bicycle facilities were a factor, to what extent did they play a role in visitors staying longer or returning for a subsequent visit?

The results of the study provide strong evidence that the economic impact of bicycling visitors to this area is significant. Key findings include:

- 680,000 visitors bicycle in the area annually, which represents 17% of all visitors to the area.
- Bicycling visitors to the area generate an economic impact of \$60 million annually.
- 1,400 jobs are supported annually.
- The quality of bicycling has a positive impact on survey respondents' vacation planning:
  - Forty-three percent reported that bicycling is an important factor in their decision to visit that area.
  - Fifty-three percent indicated that bicycling would strongly influence their decision to return to the area in the future.
  - Twelve percent reported staying three to four days longer to bicycle.

Most literature available on the economic impact of bicycling concentrates on specific attractions in which the bicycle facility itself is the primary reason for traveling to the area. No studies were found that focused on a system of bicycle facilities in which the subject of the study is just one of the many reasons people are attracted to the area. The findings in this study provide valuable evidence that the expenditure of public funds on bicycle facilities in coastal locations is a worthwhile investment.





## II. LITERATURE REVIEW

### Introduction

Tourism is an important and much sought after economic resource for many states, counties and local areas. In some states or areas, tourism is the primary industry. Competition for tourists can be quite intense. States, cities, towns, local Chambers of Commerce and/or Visitors Bureaus, and many local businesses all vie for tourist dollars. Whether it is natural attractions such as beaches or mountains, man-made attractions such as museums or historical places, or simply communities that are “quaint” or “charming”, they all become important ingredients for the various promotional efforts used to lure tourists to an area. North Carolina is no exception.

This literature review focuses on North Carolina tourism in general, coastal tourism, and more specifically, bicycling and the economic impact thereof.

### North Carolina Tourism

North Carolina is blessed by having a relatively diverse economy that has many sources of strength, not just tourism. However, tourism is one of its key strengths, particularly in the mountains and in the coastal areas. For example, according to the North Carolina Department of Commerce (1), in 2002:

- 44.4 million visitors came to the state, ranking it sixth in person-trip volume among the 50 states.
- Domestic travelers spent \$12 billion in the state.
- Tourism expenditures supported approximately 190,000 jobs.
- These employees earned almost \$4 billion in payroll income.
- Tourism generated \$1.1 billion in state and local tax revenue.

The purpose of these tourist trips to North Carolina was usually to visit friends or relatives (41%), but traveling here for entertainment (15%), or participating in outdoor recreation (10%) were also common reasons (1).

The business sectors in North Carolina that benefit from visitor expenditures were (1):

	(Billions)
Food service	\$4.1 (34%)
Transportation	3.1 (26%)
Lodging	2.2 (19%)
General retail	1.4 (11%)
<u>Entertainment/recreation</u>	<u>1.2 (10%)</u>
Total	\$12.0 (100%)

Based on the 2002 information collected by the North Carolina Division of Tourism, Film and Sports Development from the U.S. Travel Data Center and TravelScope, people living in the United States who traveled spent, on average, the following amounts per person on their total trip:

- U.S. travelers (people from the U.S. traveling in the U.S.) \$457
- North Carolina visitors (people from the U.S. traveling in N.C.) \$316
- North Carolina residents (people from N.C. traveling in N.C.) \$221

Top activities while traveling in North Carolina in 2002 included shopping (26%), visiting the beaches (13%), participating in outdoor activities (10%), and touring historical places and museums (10%). More specifically in regard to coastal travel, a study by the NC Department of Commerce (2) found that in 1999:

- Nearly eleven million domestic visitors traveled to North Carolina's coastal region (approximately one-fourth of the state's total visitors).
- Ninety percent of them came for pleasure purposes, 8% for business.
- Visitors stayed an average of 3.3 nights in the region. (This includes visitors who were there only on a day trip. Visitors that stayed overnight stayed an average of 4.6 nights.)
- Thirty-six percent stayed in a private home, which includes rental and vacation homes, while 24% stayed at a hotel, motel or bed and breakfast. Another 12% stayed in a condo or time-share.
- The average travel party size was 2.3 people.
- The average expenditure by a household in 1999 was \$396 (approx. \$52 per person per day).
- Fifty-eight percent of the households had a 1999 income of over \$50,000.

The NC Department of Commerce study also found that the main activities for coastal visitors included going to beaches (53%), shopping (24%), participating in outdoor activities (18%), and touring historical places, museums and national/state parks (27%) (2).

A study done by Strategic Marketing Research, Inc. (SMR) in 2002 provides some information specifically about visitors to the Outer Banks (3). (Note: this research only involved people who requested information about the area and then subsequently traveled there. It therefore may not represent all tourists to the area.) The main reasons for visiting the Outer Banks for first-time visitors were for sports, family reunions, or to visit a specific attraction or piece of history (3). According to the SMR study, repeat visitors came to the Outer Banks more to visit friends or relatives, or for the sun and beach, or outdoor recreation. In either case, the number one reason any visitor came to the Outer Banks was due to the variety of attractions and activities in the area (3).

When asked what places they visited or activities in which they participated, the respondents indicated slightly different priorities, depending on whether or not they had ever been to the Outer Banks before. Activities and attractions listed for both types of visitor, as well as overall percentages are given in Table 1.

**Table 1. Comparison of first-time and regular visitors' priorities of recreation at the Outer Banks.** Strategic Marketing Research, Inc., 2003.

Place/Activity	First-time Visitors	Repeat Visitors	Overall
Ocean/beaches	93.9%	81.6%	86.6%
Unique restaurants	82.7%	84.3%	83.6%
Scenic beauty	81.4%	79.2%	80.1%
Shopping	80.7%	76.3%	78.1%
Lighthouses	79.2%	73.0%	75.5%
Historic sites	71.7%	72.8%	72.3%
Scenic drive	70.6%	68.5%	69.4%
Wildlife viewing/bird watching	47.1%	47.4%	47.3%
Go on a ferry boat	31.8%	40.6%	37.0%
Art or cultural museums & galleries	32.4%	33.4%	33.0%
Lakes & natural features	32.1%	32.9%	32.6%
Fishing	18.9%	39.1%	30.9%
<b>Hiking &amp; biking</b>	<b>28.4%</b>	<b>29.3%</b>	<b>28.9%</b>
Visit aquariums	22.0%	25.1%	23.8%
Visit shipwrecks/Lifesaving stations	18.6%	20.6%	19.8%
Golf	9.9%	12.6%	11.5%
Theater performances	13.0%	7.1%	9.5%
Craft or art fair	8.5%	8.5%	8.5%
Canoeing & kayaking	7.0%	9.1%	8.3%
Amusement or theme park	10.4%	5.5%	7.5%
Camp	7.7%	7.3%	7.5%
Musical performances,	8.6%	5.6%	6.8%
Tennis	0.2%	5.8%	3.5%
Attend sports events	1.0%	2.0%	1.5%
Hunting	0.0%	1.8%	1.0%

Note that according to the SMR study, almost a third of the respondents indicated that they participated in 'hiking and biking' as part of their visit. In addition, hiking and biking was cited three to four times more often than either golf or canoeing/kayaking for first-time visitors (3).

Although according to the NC Department of Commerce (2), average party size for coastal visitors was 2.3, the SMR study specific to the Outer Banks indicates a larger group of people, who actually stay

longer as well. Outer Banks visitors stayed a day and a half to two days longer for overnight visits (3) than general coastal visitors (2).

These longer stays and larger parties are also reflected in the higher average amounts spent per trip by each party. (The average amount spent by all coastal visitors per household was \$396 in 1999, or \$52 per person per day, according to the 1999 NC Department of Commerce Travel Summary.)

**Table 2. Travel expenses for visitors to the Outer Banks.** Strategic Marketing Research, Inc., 2003.

Expenses for...	First-time Visitors	Repeat Visitors	Overall
Lodging	\$1,011	\$1,107	\$1,067
Meals	\$432	\$509	\$477
Attractions	\$146	\$134	\$139
Recreation	\$110	\$92	\$99
Novelties/Souvenirs	\$130	\$112	\$120
Shopping	\$135	\$171	\$156
Entertainment	\$53	\$18	\$33
Transportation	\$222	\$156	\$183
Other	\$6	\$30	\$20
<b>Total</b>	<b>\$2,245</b>	<b>\$2,329</b>	<b>\$2,294</b>
<b>Per person/per day</b>	<b>\$64</b>	<b>\$58</b>	<b>\$60</b>

## Bicycling Literature

There is a great deal of literature about bicycling on such subjects as bicycle safety, bicycling use and behavior, and the economic impacts thereof. Selected literature relevant to this study is discussed below.

### The Characteristics of Bicyclists

There are, of course, many types of bicyclists – they may be any age or skill level; there are those who bicycle for exercise, as a hobby, or for pleasure and those who bicycle as a form of transportation. Some people go on extended bike trips, and others only bike near their home. This study specifically targeted people over 18 years old who participate in at least some bicycling while traveling, regardless of the purpose of their trip. In a South Carolina case study of coastal areas, Sparks and Barnett differentiated their study participants into long-distance cycle tourists, destination touring cyclists, destination mountain bicycle tourists, and casual family cyclists (4, p.5).

The U.S. Department of Transportation conducted a survey of attitudes and behaviors for bicyclists and found that the average length of a bicycling trip taken on a typical summer day was 3.9 miles (5, p. 4). About 39 percent of the trips taken were less than one mile, while 7.3 percent were more than ten miles in length. The study also found that the purposes of bicycle trips were usually for recreation or exercise/health purposes (49.6%), though 43.2 percent used biking as an alternative means of transportation to go home, run errands, visit a friend or relative, or to commute to school or work (5).

The percentage of bicycle facilities used, based on the National Survey of Pedestrian and Bicyclist Attitudes and Behaviors report, were as follows (5, p.5):

- Paved roads--not on shoulders (48.1%).
- Sidewalks (13.6%).
- Bicycle paths/walking paths/trails (13.1%).
- Shoulders of paved roads (12.8%).
- Bicycle lanes on roads (5.2%).
- Unpaved roads (5.2%).
- Other (2.1%).

OmniStats, another publication of the U.S. Department of Transportation through the Bureau of Transportation Statistics, supports and adds to the Attitudes and Behaviors report with their 2002 release of the following survey results about bicycle use among adult U.S. residents (6):

- Eighty million U.S. residents bicycle for fun or exercise.
- Thirty-three million people rode a bicycle an average of six days during the 30 days prior to the survey.
- A minimum of 12% of the population rides a bicycle every month (more in warmer months).
- Of the adults who bicycle, nine out of ten do so mainly for recreation (54%), or for exercise (33%). About 6% commute to school or to work, or use a bicycle as part of their job.
- Three out of five bicyclists ride mostly on paved roads, the shoulders of paved roads or bike lanes on roads. One out of five uses bicycle/walking paths or trails. (The remainder use sidewalks or some other surface.)
- Bicyclists are more likely to be male than female (61 to 39%), earn \$50,000 or more in income (58 to 42%), and be less than 45 years old (66 to 34%).

Another survey, conducted by Beldon et al. for America Bikes, found that “a majority of Americans want to bike more and are willing to invest tax dollars in creating better places to bike” (7). More specifically, the survey found that 52 percent of Americans want to bike more than they do now, 53 percent are in favor of more federal funding for bicycle facilities, even if it means fewer funds from gas taxes for road improvements, and 50 percent support a requirement for roads to include bicycle lanes or paths even if that means less space for vehicles (7).

### What Attracts Bicyclists to a Particular Area?

There may be many reasons that bicyclists are attracted to a particular area. The quality of bicycling or of bicycle facilities may well be a factor but there are likely to be other important factors as well. For example, bicyclists may decide to travel to a coastal area primarily because it is the coast, not because of the quality of biking. As the Sparks and Barnett study in South Carolina noted, “very few visitors come to the region primarily for cycling vacations” (4).

However, it can easily be imagined that such bicyclists may prefer one coastal community over another because of the bicycling facilities and other amenities. In other words, many may travel to a coastal area specifically because it is the coast, but the quality of bicycling or of the bicycle facilities may represent the “tipping factor” that determines why one area attracts bicyclists more than another. If one community has a “bicycle-friendly” environment (bike paths or lanes, streets or roads that have wide paved shoulders so that both cars and bikes can be safely accommodated, and convenient bicycle racks near restaurants, shopping and other local attractions), while another community has given no consideration to bicycling, which community is a cyclist most likely to choose or to come back to?

Sparks' and Barnett's study suggest that South Carolina could do more to take advantage of ecotourism in general, and bike tourism in particular (4, p.5). The study noted that:

"South Carolina's coastal area is well suited to develop cycle tourism for two major reasons: physical characteristics and demographics...The terrain is flat with considerable amounts of rural roads, many with low traffic densities. Distances between towns are not great. There are a variety of natural and manmade attractions easily accessible by bicycle. The climate is moderate, with virtually year-round potential for cycling activities." (4, p.4)

They also examined the Charleston County Bicycle and Pedestrian Master Plan, as well as several other action plans around the United States and concluded that bicycling could be greatly increased through the following steps:

- Establish a formal bicycle program with a coordinator.
- Plan and constructing facilities.
- Public promotions of the advantages of bicycling.
- Increase education for cyclists and motorists.
- Strictly enforce road laws and regulations (4).

Another source for Sparks and Barnett provides a number of essential ingredients that are necessary in order to attract bicyclists, which appear appropriate to any bicycling community. "Targeting the Bicycle Touring Buck," by Tim Kneeland, explains the experience must be fun; visitors should feel they are welcome to the area and should feel safe while cycling. Kneeland also list key details which may enhance any visitor's experience:

- A unique and beautiful place to ride.
- A variety of cycling challenges and opportunities.
- Many bathrooms and showers.
- Repair facilities.
- A safe place to park their cars for the duration of their tours.
- Safe roads.
- Clear directions on where to go (8).

The U.S. Department of Transportation's Attitudes and Behaviors survey asked respondents to recommend changes that would improve bicycling safety in their communities. Obviously, if bicyclists feel unsafe riding in a community, they are less likely to want to bike there. The respondents recommended the following changes (6, p.5):

- Provide bicycle facilities, e.g., bicycle trails, paths, lanes, or racks (73.0%).
- Improve existing bicycle facilities (7.8%).
- Change existing laws governing bicycles (7.3%).
- Initiate bicycle safety education (6.7%).
- Make areas for bicycling safer (6.0%).
- Enforce laws governing bicycling (3.6%).
- Other (7.2%).



### The Benefits of Bicycling

There is an accumulation of benefits from the activity of bicycling. Unfortunately, many of these benefits are not readily transparent or easy to quantify in dollar amounts. These benefits, although not the primary purpose of this study, are no less important, and are broadly accepted:

- *Environmental*--includes improved air quality and energy conservation.
- *Health and fitness*--increased opportunity for more active lifestyles; promotes safe places to exercise, particularly for seniors; increased physical and mental well-being.
- *Transportation*--less traffic congestion, improved safety (minimized conflicts between motorists, bicyclists or pedestrians), and preservation of highway infrastructure (e.g., paved shoulders resulting in less damage to road edges).
- *Reduced Parking Required*--to the extent that people bicycle to various locations, especially congested areas, less parking is needed for automobiles. This can be very important in areas where land for parking is difficult and expensive to acquire.
- *Social*--increased quality-of-life benefits that result from living in communities that have more open space and greenways that provide more opportunities for walking or cycling and increase connectivity within a community.

One measurable benefit on which this study focuses is the economic impact of bicycling. Particularly in the case of bicycling travelers, the amount of increase in retail sales from restaurants, lodging establishments, retail stores, etc. and job preservation and creation may all indicate an economic impact from bicycle tourism. For residents of an area near dedicated bicycle facilities, such as paths or trails, they appreciate a boost in property values, while those who use the facilities enjoy reduced health care costs resulting from healthier living.

### Economic Impacts

There are two perspectives of the benefits that result from the presence of bicycle facilities in an area. Each has some economic value (i.e., people would be willing to pay something in order to obtain these benefits):

- *The benefits to local residents* who are able to utilize the bicycling amenities for recreation, exercise, commuting, etc. (In many cases, a bike path or multi-use trail also benefits walkers, joggers, and rollerbladers.) There may also be some benefits from less traffic congestion, increased bicycle and pedestrian safety, and improved air quality. In addition, more and more communities are looking at the ability of a child to safely walk or bicycle to school or to a local store as an important feature of a desirable neighborhood.
- *The benefits that result from tourists* who may be drawn to the area due to the availability of the biking amenities. This is particularly true of major bike trails such as some of the “Rails-to-Trails” conversions. The tourists spend money that benefits the local economy.

There are two basic approaches to analyzing the value of these benefits. The first, a benefit-cost analysis, attempts to measure the value of the benefits that result from the amenities, and then compares this value to the cost of providing them. If the benefits exceed the costs, the amenities are considered a desirable investment. However, particularly for bicycling amenities, this is a difficult analysis to conduct because it requires that a number of very difficult-to-measure benefits be converted to a dollar value, e.g., the benefits of exercise on health, the improvement in air quality or traffic congestion due to bicycling, and the value of recreational biking.

The second approach, an Economic Impact Analysis (EIA), uses a different method. In this type of analysis the presumption is that the main benefits that occur from an investment in an amenity of some type is the effect it has in attracting visitors or tourists from other areas. For example, a tourist attraction such as

the Wright Brothers National Memorial attracts many visitors from other areas. These tourists spend money on food, lodging and a variety of other things while visiting, and this has a direct economic impact on the local restaurants, lodging facilities, and retail merchants. Moreover, these expenditures result in increased public revenues through sales and other local taxes (each travel dollar produces about \$0.06 in state tax revenues and \$0.03 in local tax receipts). (1, p.1))

Most of the literature about the economic benefits of bicycle facilities falls in the latter category, i.e., the Economic Impact Analysis (EIA). Economic impacts result in both sales revenue and jobs comprised of three impact types:

- *Direct*: the dollars initially spent by tourists in primary local businesses such as lodging facilities, restaurants, and retail stores.
- *Indirect*: subsequent purchases by suppliers of materials and services to the primary businesses.
- *Induced*: the resulting expenditures by the workers in the direct and indirect businesses on consumer goods and services.

There are three basic steps to performing an EIA. Greatly simplified, a profile of the cycling visitors must first be developed, especially on what they spend money and how much. Second, an estimate of total cyclists must be developed. These two figures are then multiplied. The next step is to run this total dollar amount through an economic impact model that will apply appropriate economic multipliers and then estimate the amount of expenditures that accrue to the various business sectors, how many jobs are created or maintained, what local taxes are generated, etc.

Sparks and Barnett estimated the economic impact of bicycle tourism in South Carolina and concluded that it would not be unrealistic to estimate that with increased development of bicycle infrastructure and programs, bicycle tourists could be increased by 30,000 people annually. The annual economic impact of this increase in coastal tourism was estimated to be \$72 million (4).

Unfortunately, the economic impact literature on the subject of bicycling deals with special attractions in which the facility itself is the primary reason for traveling to the area (e.g., a bike path developed in an abandoned railroad right-of-way, or a river used by people for canoeing, kayaking, or rafting). No studies were found that focused on a *system* of bicycle facilities in a location similar to the area that was the focus of this study where the subject of the study is just one of many reasons that people are attracted to the area.

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### III. BICYCLING IN THE NORTHERN OUTER BANKS

#### Ten Years of Bicycle Improvements

The northern Outer Banks region of coastal North Carolina is a natural attraction for bicyclists. Looking at a map, the long, thin ribbon of land conjures images of sun and sea that are almost irresistible to those who like to travel on two wheels. In 1974, a group of Dare County citizens and decision makers who understood that appeal initiated an effort to improve conditions for bicycling in the area. They began by lobbying the North Carolina Department of Transportation for assistance. A basic bicycle plan was developed and NCDOT officials were invited to tour the area and assess the possibilities. At that time, neither the NCDOT nor the federal government had set aside any special funds for such facilities. Although everyone could see the potential, it was not until the late 1980's, when NCDOT funding was first earmarked for construction of bicycle facilities, that the Bicycle Program (now the Division of Bicycle and Pedestrian Transportation) could begin to plan, fund, design and build bicycle improvements in the region.

Over the past ten years, NCDOT has built an extensive system of special bicycle facilities in the region. Multi-use paths, wide paved shoulders and wide curb lanes now link the towns and villages from Corolla south to Nags Head and west to Manteo. To date, approximately \$5.9 million of Bicycle Transportation Improvement Program funds have been allocated for these facilities. The Towns of Nags Head and Duck and the Dare County Tourist Bureau also contributed approximately \$800,000 toward construction costs bringing the total public investment in dedicated funds to approximately \$6.7 million. In addition, NCDOT has incorporated other improvements, such as bicycle-safe accommodations on bridges and additional width on roadways, into scheduled highway projects. Expenditure figures for these bicycle improvements are not available as they were incorporated into overall project costs. In some areas, developers have used private funds to build bicycle facilities as well. Combined, these improvements have made bicycling a viable transportation option in the region and have enhanced bicycle recreation opportunities. The considerable investment of public funds reflects the strong desire of residents and visitors alike to be able to bicycle to their destinations and to just enjoy traveling under their own power.

Shown below in **Table 3** is a comprehensive list of independent\* bicycle projects built within the study area, from north of the Currituck Lighthouse to Whalebone Junction in Nags Head and in Manteo. Project costs, approximate mileages and year constructed are also shown for each project.

**Table 3. Northern Outer Banks Bicycle Facilities, with corresponding cost to construct, length and year installed.** \*Independent project funding provided by state, federal and/or municipal funds. Does not include projects built in conjunction with a highway or bridge improvement or by developers. \*\*Traffic counts and/or intercept surveys were conducted on these projects.

Bicycle Project Location	Estimated Cost* (dollars)	Length (miles)	Year
<b>Currituck County Bicycle Projects</b>			
NC 12 paved shoulder project from north of Corolla Lighthouse to Dare County line (built in phases)**	1,707,741 (300,000 paid by Currituck County)	12.1	2000, 2002
<b>Dare County Bicycle Projects</b>			
Side Path along NC 12 from Currituck County line to Duck	230,151	2.8	1999
Bike lane along NC 12 in Duck**	225,000 (120,000 paid by locality)	1.2	1998
Side Path along NC 12 from Duck to Southern Shores (US 158)**	438,740	3.9	1999
Side Path along US 158 in Southern Shores	84,840	1.1	1997
NC 12 paved shoulder project from Kitty Hawk to Whalebone Junction (built in phases)**	1,760,000	16.0 (approximate)	1997-1999
Woods Road Bike Path along SR 1206 in Kitty Hawk	338,000 (paid by locality, designed by and managed by NCDOT)	2.0	1999
Kitty Hawk Road (SR 1206) paved shoulder project in Kitty Hawk	188,447	1.7	2000
Veteran's Drive Bike Path in Kill Devil Hills	65,000 (32,500 paid by locality)	0.4	1997
Wright Brothers Bike Path Phase I in Kill Devil Hills	118,238	1.0	1996
Collington Road Bike Path Extension in Kill Devil Hills	43,646	0.5	1999
Side Path along NC 12 in Nags Head (built in three phases)**	1,145,500	8.8	1997-1998
Side Path along US 64/264 in Manteo**	382,000	4.25	1994
<b>Total Facilities in northern Outer Banks</b>	<b>\$6,727,303</b>	<b>55.75 miles</b>	

## **A System of Bicycle Facilities Encourage Usage and Improve Safety**

Bicycle facilities greatly enhance the safety and enjoyment of local and visiting cyclists alike, providing bicycle access to many residential and commercial areas, beach access sites, tourist destinations and points of interest. In addition, the bicycle facilities provide benefits for all road users. Congestion is reduced, and the



addition of paved shoulders enhances motorist safety and extends the life of the roadway. Descriptions and photographs of the bicycle improvements, listed from north to south through this region, are shown below. Their locations are also displayed on detailed maps of the northern Outer Banks seen in Appendix A (page 45). Unless specified otherwise, these projects were funded, designed and built by the NCDOT Division of Bicycle and Pedestrian Transportation through the Bicycle Transportation Improvement Program.

#### **NC 12 from Corolla to Dare County Line**

This narrow, heavily-traveled roadway was improved for bicyclists and motorists alike by the provision of 4-ft wide paved shoulders on each side of the road for approximately 12 miles. Completed in phases, NCDOT designed, funded and administered this bicycle facility improvement. (See letter A on Figure 25 on page 45.)

#### **Duck Trail along NC 12**

This facility consists of a side path parallel to NC 12 from the Currituck County line to the northern Duck town limits that transitions to a wide paved shoulder section, marked as a bike lane, through town. The 8-ft wide asphalt side path carries two-way bicycle and pedestrian traffic. The shoulder/bike lane section is 1.2 miles long and has 4-ft shoulders on each side of NC 12. The Duck Trail provides access between residential, recreational and commercial areas in Duck. Funding for this project was provided by NCDOT with participation by the Town of Duck. (See letters B and C on Figure 25 on page 45.)



Wide paved shoulder/bike lane in Duck on NC 12. Photo Courtesy NCDOT.

#### **Southern Shores Side Path along NC 12 and US 158**

Built in phases, this 6- to 8-ft multi-use side path carries both bicycle and pedestrian traffic from Duck to the Southern Shores Town Hall and provides an alternative to the heavily-traveled roadways in the area. The facility connects residential areas, beach access areas and retail outlets. (See letters D and E on Figure 26 on page 46.)

#### **NC 12 from Kitty Hawk to Whalebone Junction**

Bicycle usage in this corridor was high even before the addition of 4-ft wide paved shoulders to improve bicycle safety. This is the old beach road, tucked behind the first row of sand dunes, and provides access to many residences, commercial establishments and the numerous beach access areas along the strand. The paved shoulder project through this area is approximately 16 miles long. (See letter F on Figure 26 on page 46.)

#### **Woods Road Bike Path in Kitty Hawk**

This off-road 8-ft wide, two-way bicycle and pedestrian path runs for two miles on the west side of Woods Road and provides an important link from Kitty Hawk to Southern Shores. The project was paid for with local funds and was designed and administered by NCDOT. (See letter G on Figure 26 on page 46.)

#### **Kitty Hawk Road (SR 1206) in Kitty Hawk**

Kitty Hawk road is a two-lane road that is heavily used by residents as an alternative to congested NC 12 and US 158. Four-foot wide paved shoulders were added along a 1.7 mile section of the road to

provide dedicated space for cyclists. This project links to the Woods Road bike path (see above) at its northern terminus and to NC 12 on the south, providing an important link in the bicycle transportation system. (See letter H on Figure 26 on page 46.)

### Kill Devil Hills Bicycle Improvements

Built as discrete projects, the three facilities described below provide a viable bicycle transportation alternative to the congested roads in the area. These facilities form a continuous 2.4 mile off-road connection between residential areas, the First Flight Elementary and Middle Schools, the local government complex, commercial areas and the Kill Devil Hills beach access areas along NC 12, Beach Road. (See letter I on Figure 26 on page 46.)

- Wright Brothers Memorial Bike, Path Phase I, in Kill Devil Hills - This one-mile off-road bicycle and pedestrian path is eight feet wide and carries two-way bicycle and pedestrian traffic. It provides a connector through the Wright Brothers' National Memorial property.
- Collington Road Bike Path Extension in Kill Devil Hills – This short, 0.5-mile, section of off-road path is built on the north side of Collington Road, a narrow two-lane road. The path is eight feet wide and carries two-way bicycle and pedestrian traffic.
- Veteran's Drive Bike Path in Kill Devil Hills – This 8-ft wide two-way bicycle facility provides direct access from neighborhoods to two schools and is heavily used by children. It is 0.4 miles in length.

### Nags Head Side Path along NC 12

Built in phases, this off-road facility runs along the east side of NC 12/Virginia Dare Trail for 8.8 miles. The path is eight feet wide and carries two-way bicycle and pedestrian traffic. Primary usage is by novice and child cyclists as well as by rollerbladers, skateboarders and parents pushing baby strollers. For this reason, the more experienced cyclists typically ride on the wide paved shoulders built to accommodate bicyclists, on each side of the road, rather than on the bike path. (See letter J on Figure 27 on page 47.)



Nags Head Side Path – an off-road facility. Photo courtesy of NCDOT



Manteo Side Path. Photo Courtesy NCDOT

### Manteo Side Path along US 64/264

This 5-ft wide trail provides an off-road bicycle and pedestrian alternative to US 64/264 from the Croatan Sound through Manteo to NC 345. The four-mile project included construction of two sections of asphalt path that linked with existing sections of concrete sidewalk to complete the corridor. Incidental bicycle improvements built as part of highway and bridge projects extend this corridor to Whalebone Junction, linking to the bicycle improvements along NC 12. (See letter K on Figure 27 on page 47.)

## IV. STUDY RESULTS – SURVEY OUTCOMES

A variety of surveys and bicycle traffic counts were conducted in the northern Outer Banks region, which was chosen for this study based on known bicycling in the area and the presence of bicycle facilities. (See Table 3 for a list and description of facilities used in this study.) The surveys and bicycle traffic counts may be broken down into four parts in order to study this bicycling activity:

- **Intercept surveys** were conducted by interviewers who stopped bicyclists riding by three survey locations from July 30 to August 1, 2003. Questions were intended to develop a “profile” of bicyclists and their perceptions of the quality of cycling in the area. The cyclists surveyed were both visitors to the area and local residents. A limited number of these surveys were also made available at two local bicycle shops. (Respondents who filled out an intercept survey are generally referred to as either *Intercepted Visitor Cyclists*, or *Intercepted Resident Cyclists*.)



Example of a Survey Station intended to intercept both visiting and residential cyclists. Photo courtesy NCDOT

- **Self-administered surveys** aimed at general visitors (cycling and non-cycling) were made available at three visitor centers in the area, primarily to find out what proportion of respondents engaged in some bicycling activity while in the area. They were collected on-site in Manteo and Southern Shores and could be mailed back over a six-week period from July to September 2003. (These respondents are generally referred to as either *Visitor Center Cyclists*, or *Visitor Center Non-Cyclists*.)
- **Mail-back surveys** were sent to the owners or managers of Bed and Breakfast and campground establishments and were made available to their guests.
- **Pneumatic tube counters** were placed on bicycle facilities at eleven locations (off-road paths and wide paved shoulders) to physically count users of the facilities over a period of one week from July 29 to August 4, 2003.

The results of these surveys and counts are discussed below. More details on the survey methodology can be found in Appendix B (page 49). Through each method of data-collection, a certain number of respondents were attained. Non-response information was not collected for comparison, but total response numbers are listed below. Although these numbers represent how many people returned a survey, note that each respondent did not necessarily answer all the questions. This form of non-response was tracked, and unanswered questions are not reflected in the charts and graphs following.

**Table 4. Respondent types and total surveys collected from each type.**

Respondent Type	Total
Intercepted Respondents (Visitors and Residents)	173
Visitor Center Respondents (Cyclists and Non-cyclists)	392

## Intercept Survey Respondents

A key part of the Economic Impact Analysis was to develop a “profile” of visitors actually using bicycle facilities in the area. This was accomplished by conducting “intercept” surveys of bicyclists at three locations adjacent to bicycle facilities over a period of 2½ days (two of the locations were in Duck, one was in Nags Head, as shown in the detailed maps in Appendix A on page 45.)

The questions covered such topics as the size of the travel party, the amount of bicycling done, perceptions of the quality of cycling in the area, and how much was spent while on the trip. A copy of the questionnaire is included in Appendix G (page 71).

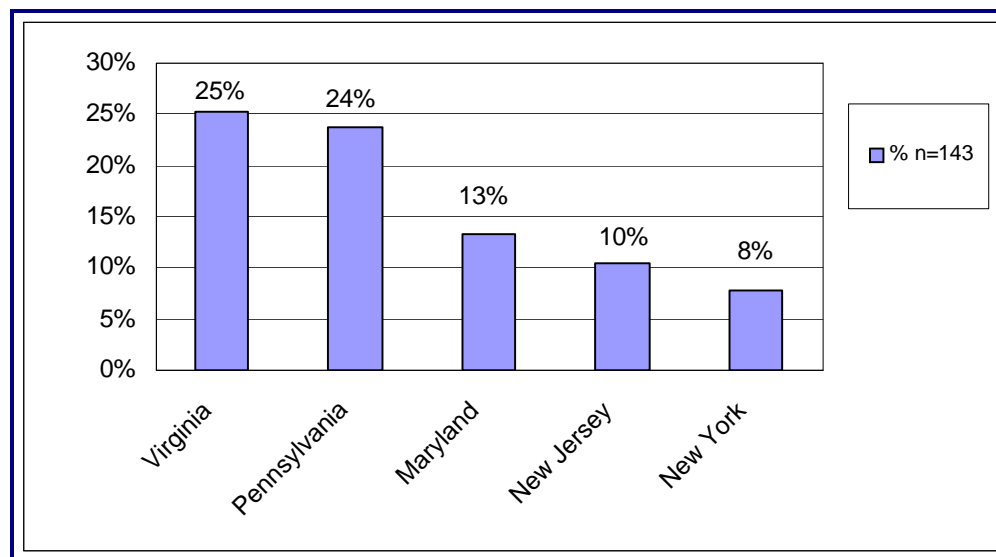
Although the focus of the intercept survey was on visiting cyclists, local residents using the facilities were also surveyed. (See the Intercepted Resident Cyclist Survey on page 74.) It was recognized that even though residents don’t figure into an Economic Impact Analysis, the availability of bicycling facilities also benefits them. A summary of the survey responses by residents can be found in Appendix D (page 59).

Following are the findings from the intercept surveys of visitors.

### Demographics

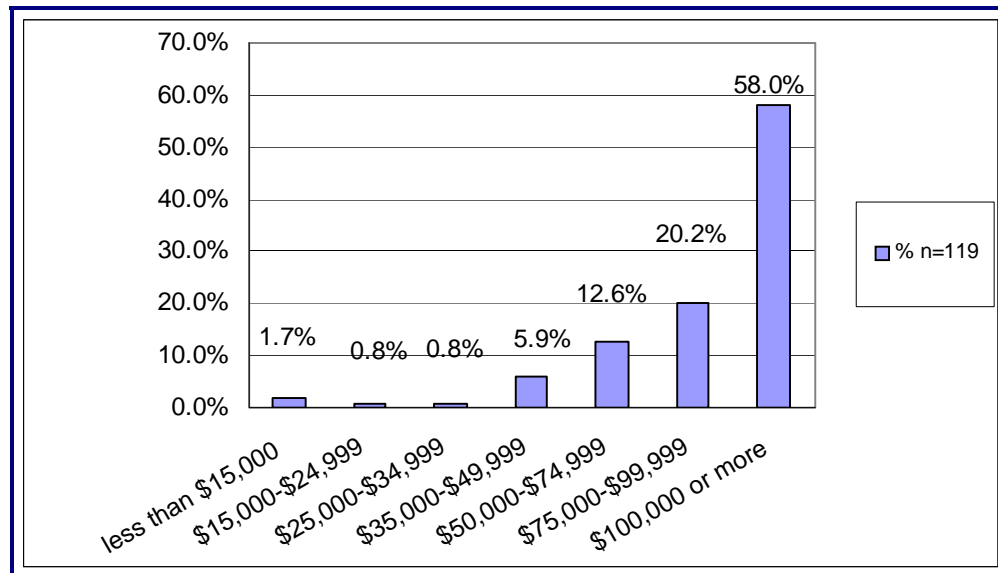
About 80 percent of domestic Intercepted Visitor Cyclists came from the five states shown in Figure 1. Only three percent of Intercepted Visitor Cyclists came from North Carolina. The origins of the remaining domestic visitors are scattered throughout the U.S. Six cycling visitors (about four percent of total respondents) came from the countries of Scotland, the Czech Republic, Lithuania, Turkey and Poland. (Because all of the foreign visitors came for work purposes, not tourism, they were not included in the analysis.)

**Figure 1. Intercepted Visitor Cyclists: top five states of origin.**



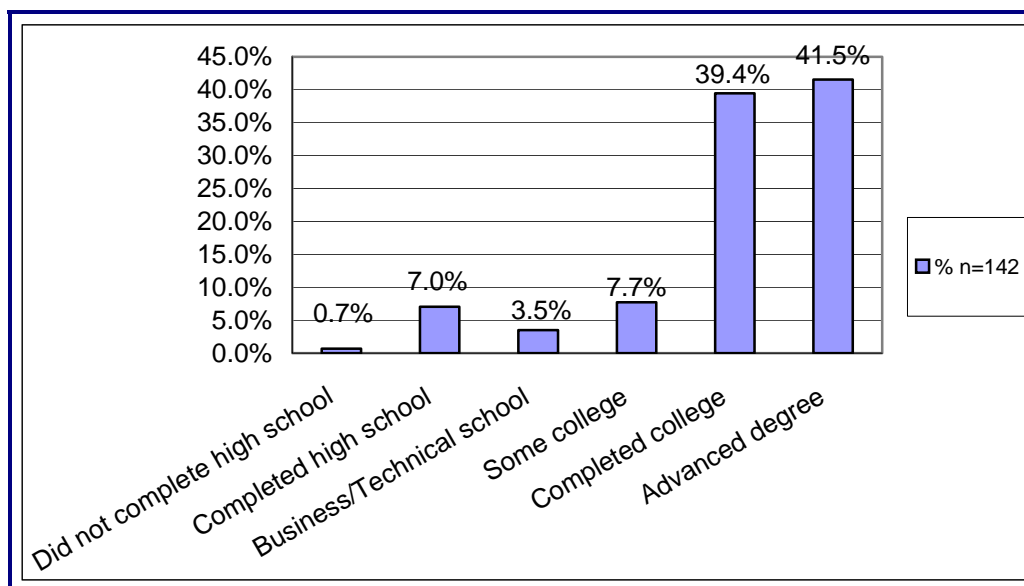
As shown in other research, bicyclists tend to be relatively affluent and well educated. The household income of intercept survey respondents visiting the northern Outer Banks is shown in Figure 2. Seventy-eight percent of the respondents indicated that they have household incomes of \$75,000 or more.

**Figure 2. Intercepted Visitor Cyclists: household income.**



The education level of respondents is also quite high. As shown in Figure 3, 81 percent have earned a college degree. Forty-two percent have an advanced degree.

**Figure 3. Intercepted Visitor Cyclists: education levels.**





Other demographic highlights include:

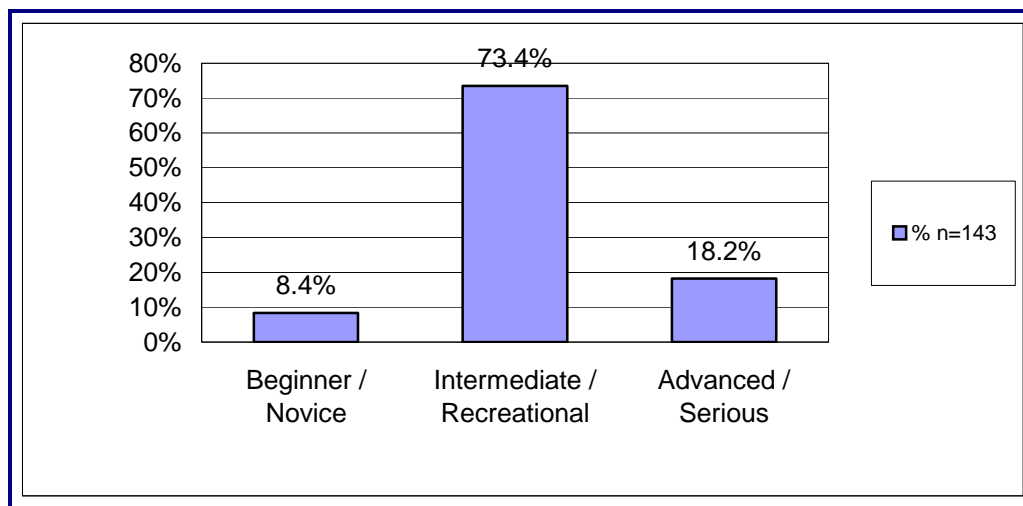
- Visitor ages ranged from 18-70 with an average of 44.7. Fifty-two percent were male, 48% female.
- The furthest traveling international respondent came from Turkey. Most of the others came from Eastern Europe. All of the international visitors came for work reasons.

Only one domestic visitor out of 143 came to the area for work reasons.

### **Bicyclists' Characteristics**

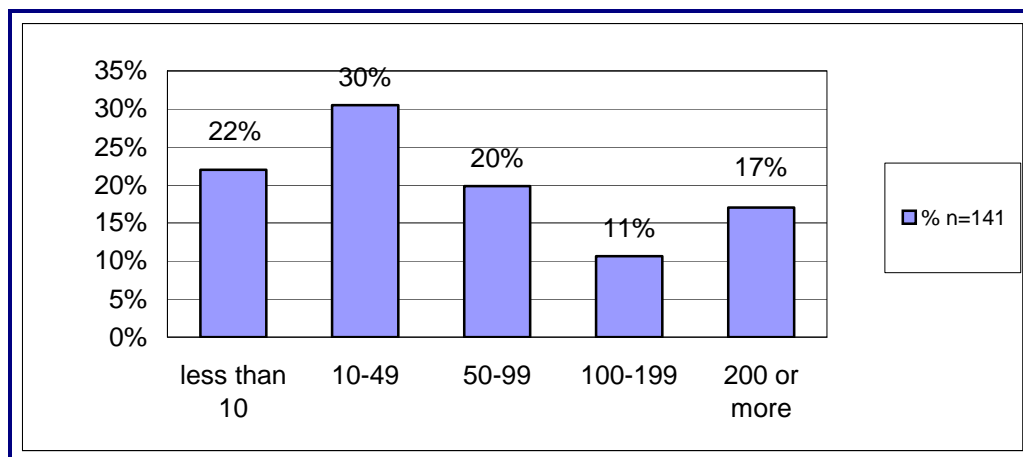
Most of the respondents (73.4%) rated themselves as Intermediate/Recreational in terms of their cycling ability. Exactly 18.2 percent regarded themselves as Advanced/Serious cyclists, and 8.4 percent as Beginner/Novice. Note: Intercept surveys were also analyzed by the skill level of the bicyclists. These results are included as Appendix C (page 53).

**Figure 4. Intercepted Visitor Cyclists: bicycling skill ratings.**



The Intercepted Visitor Cyclists indicated a wide range of riding activity as shown below in the chart of average miles typically ridden per month.

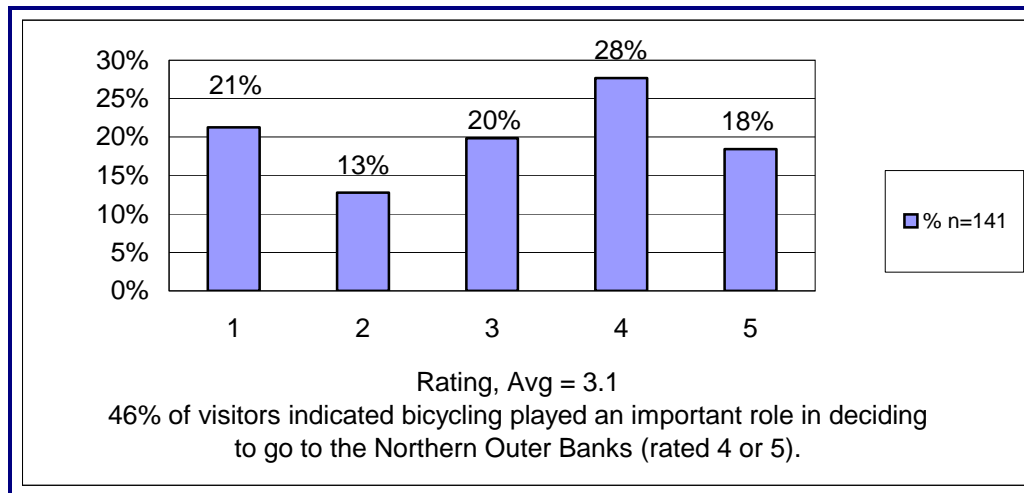
**Figure 5. Intercepted Visitor Cyclists: miles per month ridden.**



### Importance of Bicycling

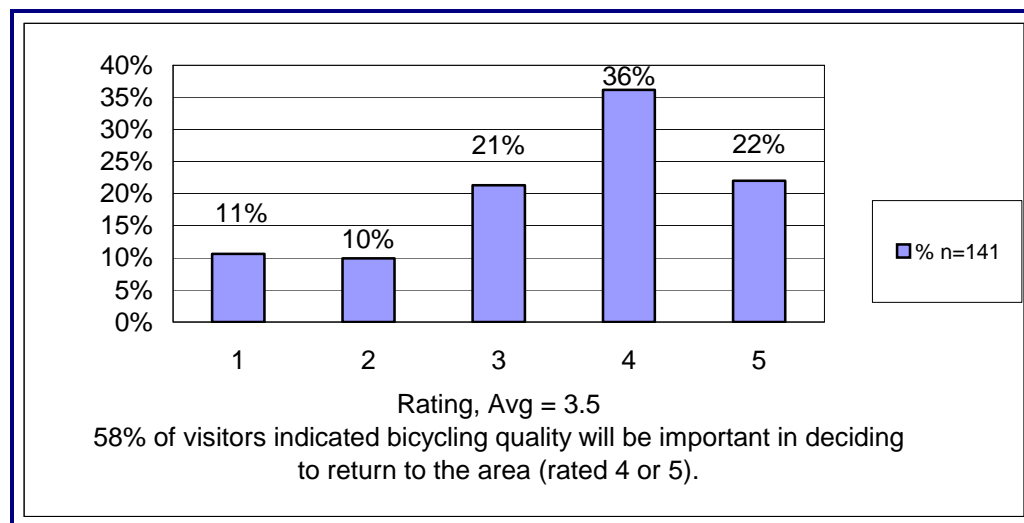
Respondents were asked to rate the importance of bicycling in their decision to visit the northern Outer Banks. As shown in the chart below, 46 percent indicated that bicycling was quite important in their decision (rated as either a 4 or 5, where 1 = Not Important and 5 = Very Important).

**Figure 6. Intercepted Visitor Cyclists: importance of biking in decision to come to northern Outer Banks.**



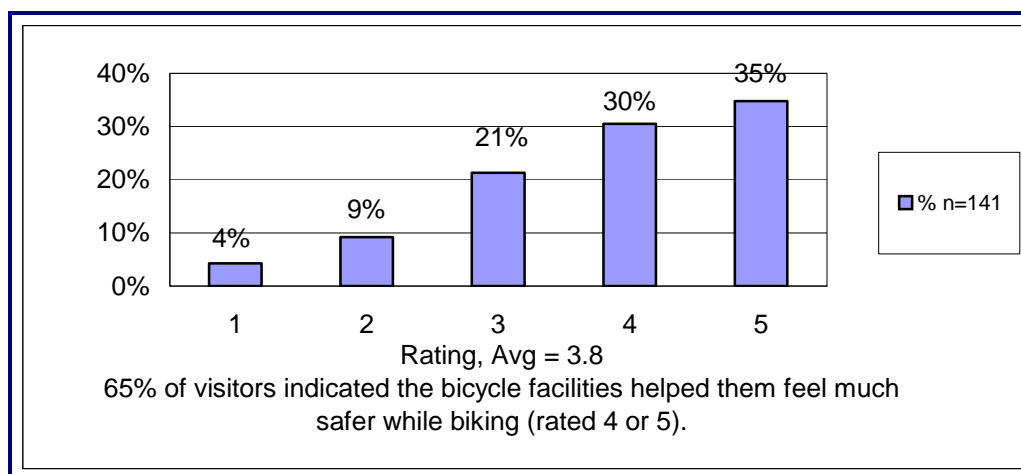
Interestingly, a higher percentage (58%) of respondents said that bicycling would be important to their decision to return to the area (rated as either a 4 or 5, where 1 = Not Important and 5 = Very Important). This suggests that once exposed to the quality of bicycling in the area, visitors are more likely to return.

**Figure 7. Intercepted Visitor Cyclists: importance of bicycling in decision to return to the area.**



Respondents also indicated that the presence and quality of the bicycle facilities made them feel safer while riding, with 65 percent rating this question either a 4 or 5 (where 1 = Not a Factor and 5 = A Great Deal).

**Figure 8. Intercepted Visitor Cyclists: feeling of safety due to bicycle facilities.**



### Trip Information

An important finding from the survey was that eleven percent of Intercepted Visitor Cyclists answered that their visit duration was longer because of biking by an average of three days (with a range of two to seven days longer). Following is additional information from the surveys about such factors as the nature of the trips being made, the size of the travel parties, the types of accommodations used, and the amount of bicycling done.

- Most visitors came in travel groups of Multiple Families (58%). Single Families were the next most frequent group (22%). The number of adults ranged from one to 26, with an average of 6.3. The number of children (defined as younger than 18) was zero to 16, with an average of 2.9 (some respondents were in the Individual or Couple groups and did not have children.).
- Cycling starting points varied, but the most frequent points were Duck (19%) and Southern Shores (14%). This is likely due to the fact that the surveys were conducted in this area.
- The most common destinations included Duck (33%) and Corolla (7%). Eight percent of visitors were just out for a ride, with no particular destination.
- Rides averaged 7.2 one-way miles, with a range of 1 - 20 miles. (The national survey cited in the literature review stated that an average trip on a typical summer day was 3.9 miles—round trip.)
- Seventy percent of Intercepted Visitor Cyclists brought their own bike.
- Visitors stayed in Rental Homes most frequently (70%) with an average stay of eight days. Condos/Time Shares were second with 8% and an average stay of 6.8 days. Hotels/Motels/Resorts had 7% with an average stay of 2.9 days.
- The top three towns stayed in (or near) were Duck (40%), Nags Head (25%) & Southern Shores (13%).
- The top three recreational activities while in the area were Beach activities (25%), Shopping (19%), and Sightseeing/cultural attractions (17%).
- Trips ranged from 2 - 90 days in duration and averaged 8.6 days. Visitors answered they would bike 0 - 21 days, with an average of 5.4 days.



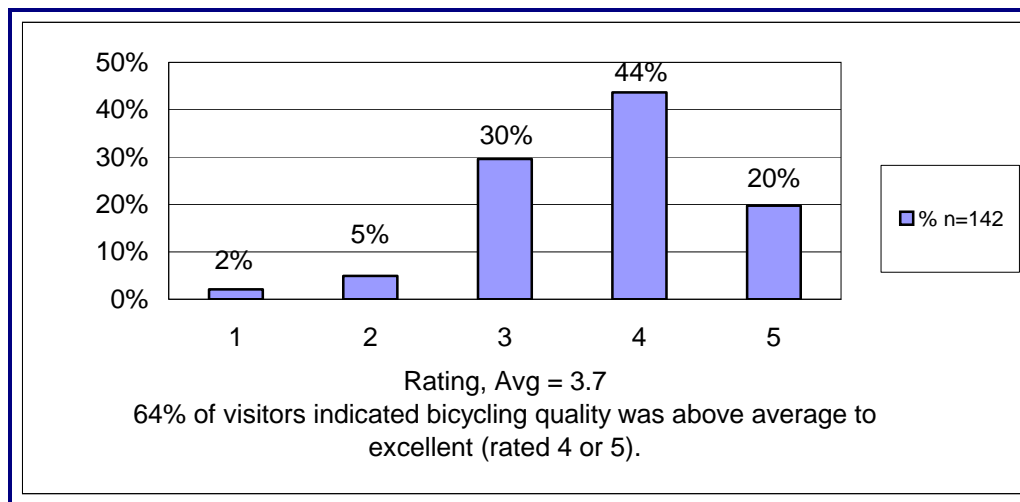
- Visitors took similar trips to the northern Outer Banks an average of 0.66 times in the last twelve months (range of 0 – 4 trips), and an average of 1.1 times to other areas (range of 0 – 10 trips).
- Respondents expected to make an average of 0.9 similar trips in the coming twelve months (range 0 - 4).
- The most common trip months (past and planned) were July (43% past, 43% planned), and August (23% past, 21% planned).

#### Attitudes about Bicycle Facilities and Investments

An important aspect of the survey was to determine the visiting bicyclists' attitudes toward the quality of bicycling in the area in general, and towards bicycle facilities in particular. (All ratings were from 1 to 5, where 1 = Poor, and 5 = Excellent.)

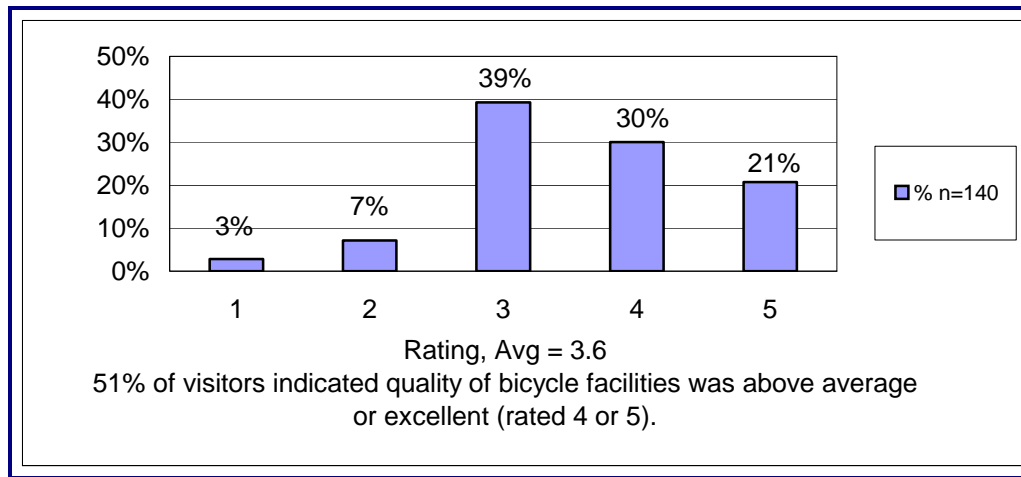
When asked about their opinion of the quality of bicycling in the area, 64 percent considered it above average or excellent (rated either a 4 or 5).

**Figure 9. Intercepted Visitor Cyclists: quality of bicycling in the area.**



Similarly, 51 percent of respondents gave a high rating to the quality of bicycling facilities in the area, while only ten percent rated the quality as low.

**Figure 10. Intercepted Visitor Cyclists: quality of bicycle facilities in the area.**



### Investment Priorities

Other Intercepted Visitor Cyclist survey highlights:

- Seventy-six percent indicated additional facilities should be built in the area.
- Ninety-five percent favored the use of state and/or federal funds to build such facilities.
- The top five priorities given for improving bicycle facilities were, in order of priority: Wider Bike Lanes, More Bike Paths, Wider Bike Paths, Bike Path Only (no walkers), and Crossing Areas. (See Appendix F, on page 63 for more detail on investment priorities.)

### Spending Patterns

The key to the Economic Impact Analysis is determining how much visitors spend while in the area and on what. These findings are summarized below:

**Table 5. Intercepted Visitor Cyclists: list of expenditures per visitor per day.**

Expense Category	Expenditure (\$ per person per day)
Accommodations	43
Restaurants/fast food/bar	25
Groceries/beverages/snacks	23
Retail/shopping	23
Recreation/entertainment	19
Bicycle accessories/equipment	4
Car/fuel	13
<b>Total</b>	<b>\$150</b>

## Visitor Center Respondents - General Tourists

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In addition to surveying Intercepted Visitor Cyclists, general tourists to the area were also surveyed. This was accomplished by making questionnaires available at three visitor centers—two in Manteo and one in Southern Shores. A copy of this questionnaire is included in Appendix G (see Visitor Center Survey on page 68).

The primary purpose of surveying general tourists was twofold:

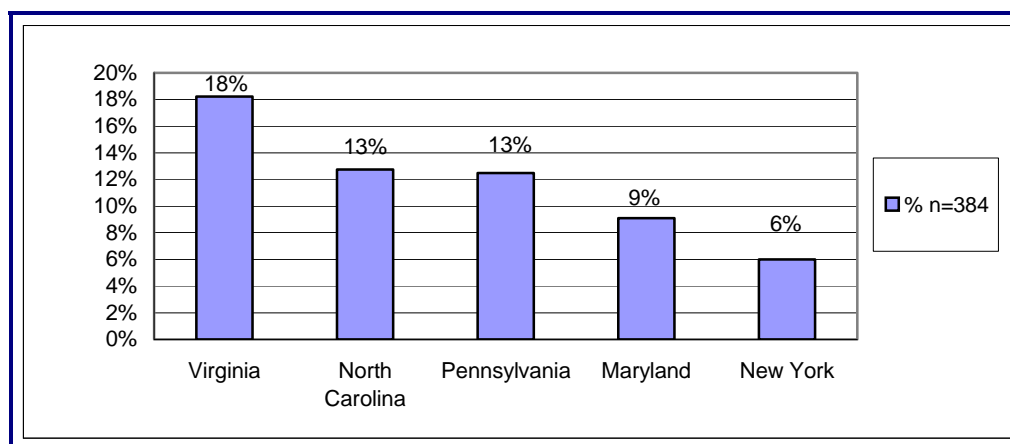
- To determine the percentage of tourists that engage in bicycling while in the area.
- For those who engage in some bicycling, to determine how important bicycling was in their decision to visit the area.

### Demographics

- Visitor ages ranged from 18-75 with an average of 47.4. Thirty-two percent were male, 68% female.
- The furthest traveling international respondents came from New Zealand. Most of the others came from Western Europe. None of the international visitors came for work reasons. (There were eleven non-U.S. resident visitors total.)
- Only three visitors (1%) came to the area for work reasons. Ten visitors responded Vacation (9%) and Other (7%) as their reasons to come to the area. (One individual responded Work and Vacation).
- The number of adults ranged from 1 - 88 (a tour group), with an average of 4.9 people. The number of children ranged from 0 - 15, with an average of 1.5 children.
- Visitors stayed in Hotels/Motels/Resorts (30%) and Rental Homes (30%) most frequently. The overall average stay was 6.4 days. Not enough respondents answered how long they stayed in each accommodation type to determine averages for each of them.
- The top towns stayed in (or near) were Nags Head (20.6%), Kill Devil Hills (12.9%), Kitty Hawk (10.6%), Duck (9.4%), Manteo (5.5%), and Corolla (5.3%).
- The top three recreational activities were Sightseeing/cultural attractions (85%), Beach activities (82%), and Shopping (72%). Seventeen percent of respondents marked Bicycling as one of their recreational activities.

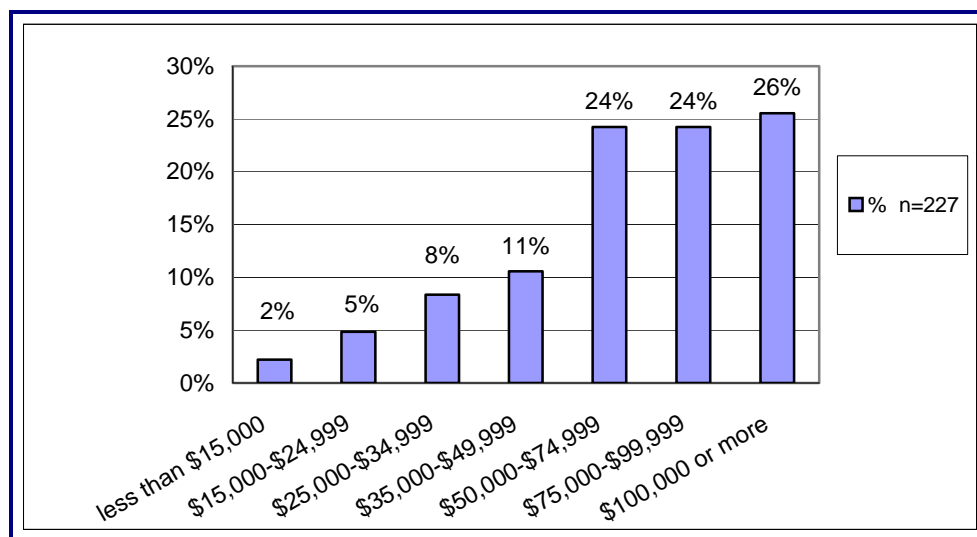
As shown in Figure 11, visitors from North Carolina accounted for 13 percent of visitor center survey respondents (second only to Virginia at 18 percent). In general, tourists tended to come from mid-Atlantic and northeastern states, very much like the intercepted visiting respondents. One difference is that a higher proportion of Visitor Center Respondents than Intercepted Visitor Cyclists come from elsewhere in North Carolina (13% vs. 3%, respectively).

**Figure 11. Visitor Center Respondents: top five states of origin.**



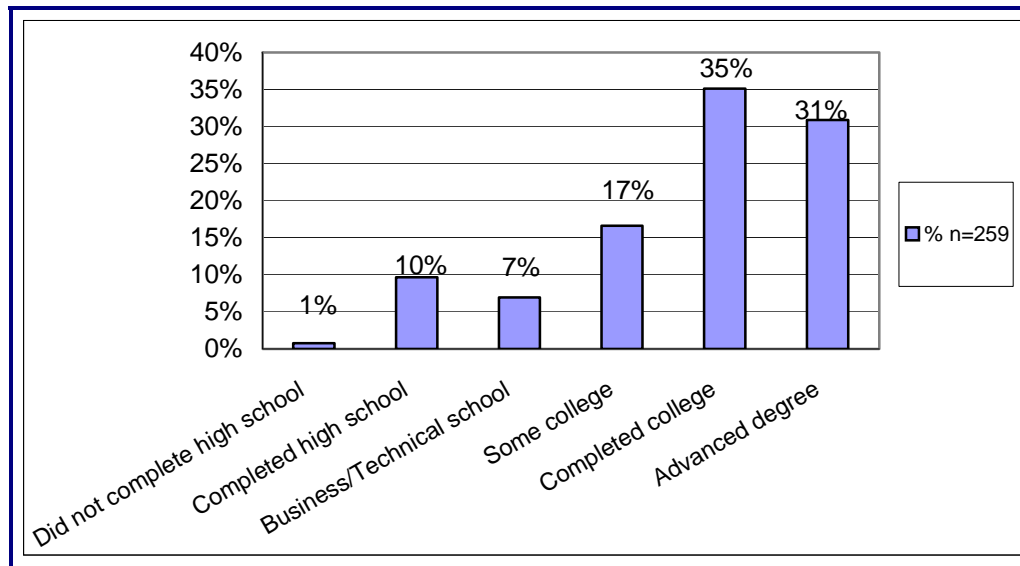
Like the intercept respondents, the general tourists are relatively affluent although they are not as affluent as the Intercepted Visitor Cyclists. Approximately one-half of the respondents reported a household income of more than \$75,000 per year compared to 78 percent for the intercepted visiting respondents.

**Figure 12. Visitor Center Respondents: household income.**



The visitors are also well-educated., with about two-thirds having earned a college degree, compared to 81 percent for the intercepted visiting respondents.

**Figure 13. Visitor Center Respondents: education level.**



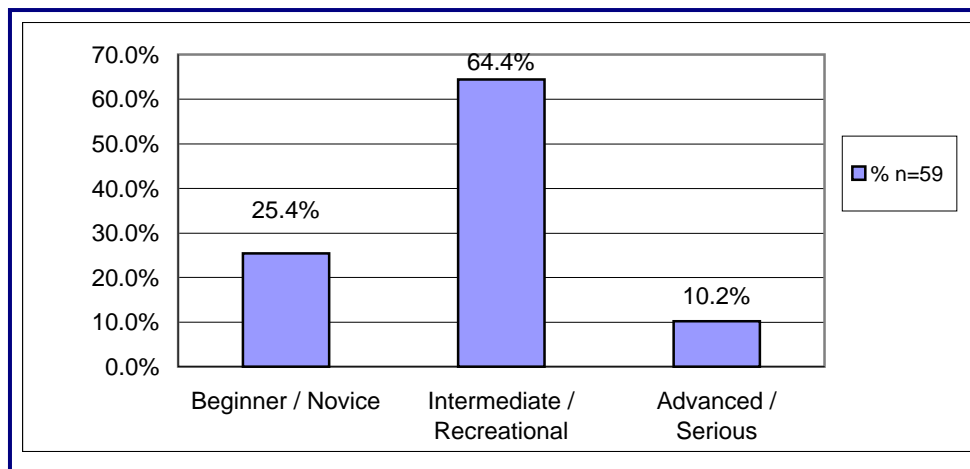
As indicated above, seventeen percent of the general tourists in the survey indicated that they engaged (or would engage) in bicycling during their trip to the northern Outer Banks. *The following charts and information show responses only from those tourists, identified as Visitor Center Cyclists.*

### Bicyclist Characteristics

- Sixteen percent of Visitor Center Cyclists answered that their visit duration was longer because of biking. Their visit was longer by two to seven days, with an average of four days longer.
- Sixty-two percent of Visitor Center Cyclists brought their own bike.

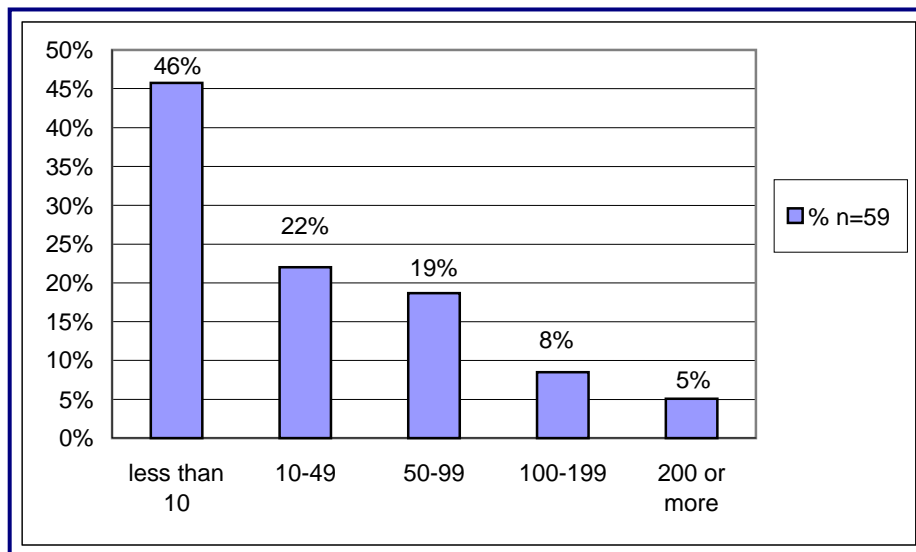
In terms of bicycling skill levels, 25.4 percent of Visitor Center Cyclists answered they were Beginners/Novices, 64.4 percent rated themselves at Intermediate/Recreational level, and 10.2 percent answered they were Advanced/Serious riders. This compares to 8.4 percent, 73.4 percent and 18.2 percent respectively for the Intercepted Visitor Cyclists.

**Figure 14. Visitor Center Cyclists: bicycling skill ratings.**



The Visitor Center Cyclists tend to ride less on average than the Intercepted Visitor Cyclists. For example, 22 percent of intercepted visiting respondents ride less than ten miles per month compared to 46 percent for the Visitor Center Cyclists. At the other end, 17 percent of Intercepted Visitor Cyclist respondents ride 200 or more miles per month compared to only 5 percent for the Visitor Center Cyclists.

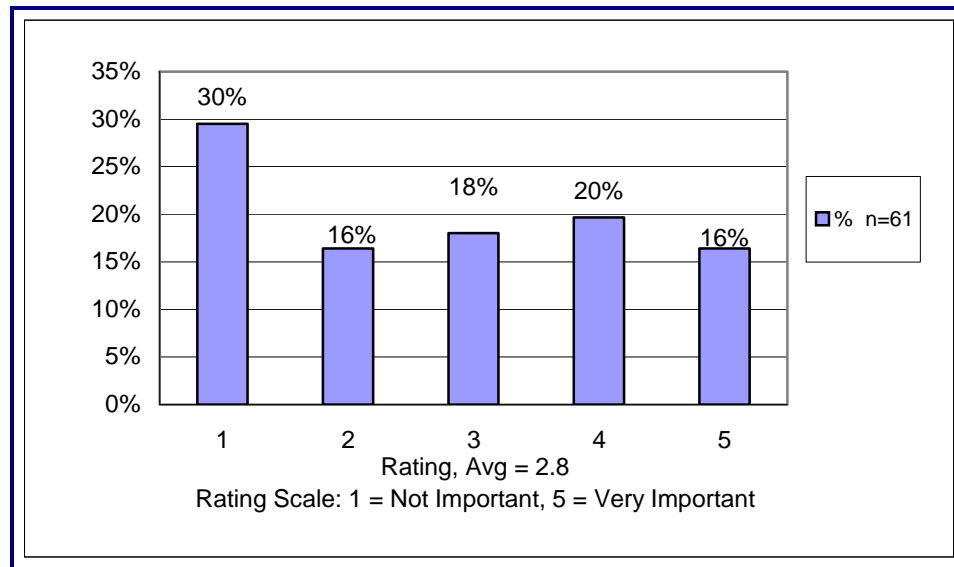
**Figure 15. Visitor Center Cyclists: miles per month ridden.**



### Importance of Bicycling

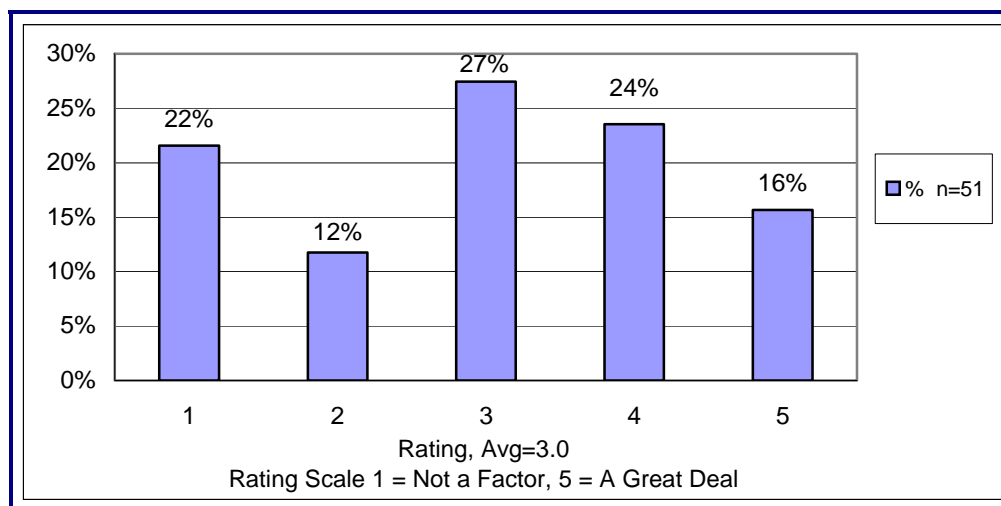
Thirty-six percent of the Visitor Center Cyclists indicated that bicycling played an important role in their decision to come to the northern Outer Banks (rated it either a 4 or 5). The average rating of 2.8 was slightly lower than the 3.1 rating by the Intercepted Visitor Cyclist respondents.

**Figure 16. Visitor Center Cyclists: importance of bicycling in decision to come to northern Outer Banks.**



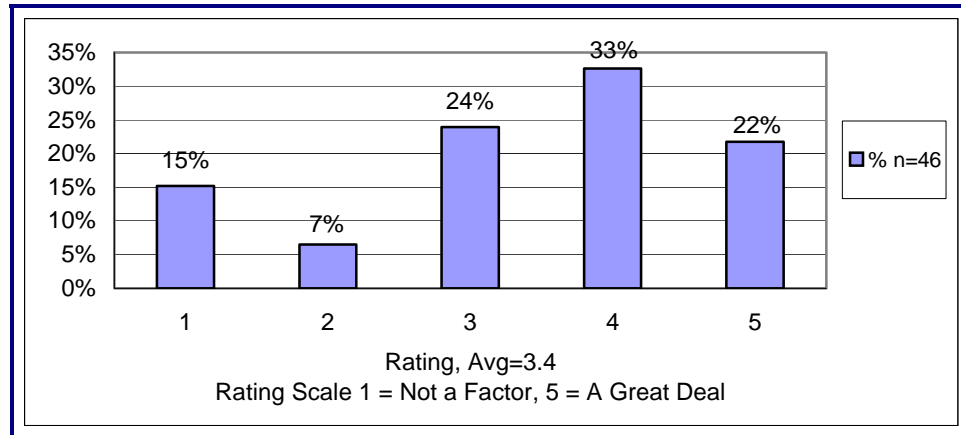
Forty percent of Visitor Center Cyclists indicated bicycling quality would be important in deciding to return to the area. Fifty-eight percent of the Intercepted Visitor Cyclists indicated likewise. The average rating was 3.0 and 3.5, respectively.

**Figure 17. Visitor Center Cyclists: importance of bicycling in decision to return to the area.**



Fifty-five percent of Visitor Center Cyclists indicated the bicycle facilities helped them feel safer while bicycling, compared to 65 percent for the Intercepted Visitor Cyclists (average rating of 3.4 and 3.8, respectively).

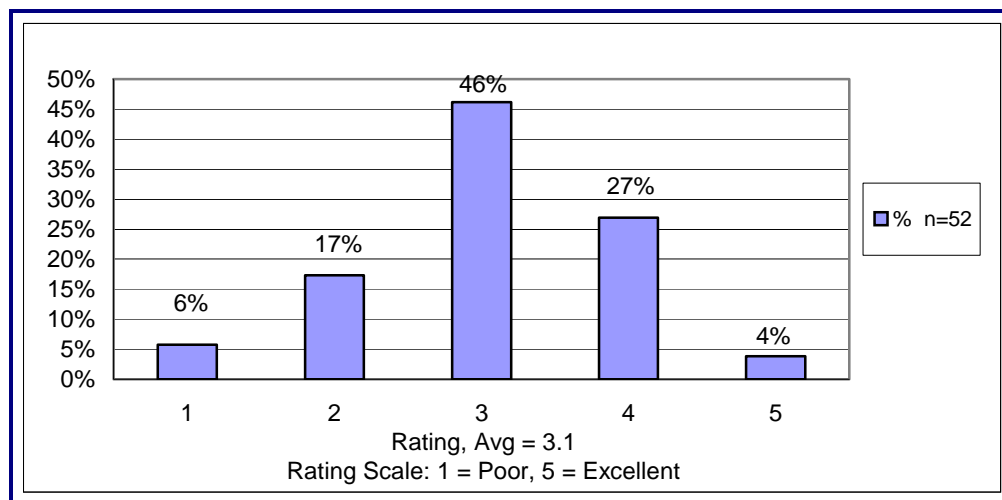
**Figure 18. Visitor Center Cyclists: feeling of safety due to bicycle facilities.**



#### Attitudes about Bicycle Facilities and Investments

Thirty-one percent of Visitor Center Cyclists indicated that bicycling quality was above average to excellent, compared to 64 percent for Intercepted Visitor Cyclists. The average ratings were 3.1 and 3.7, respectively.

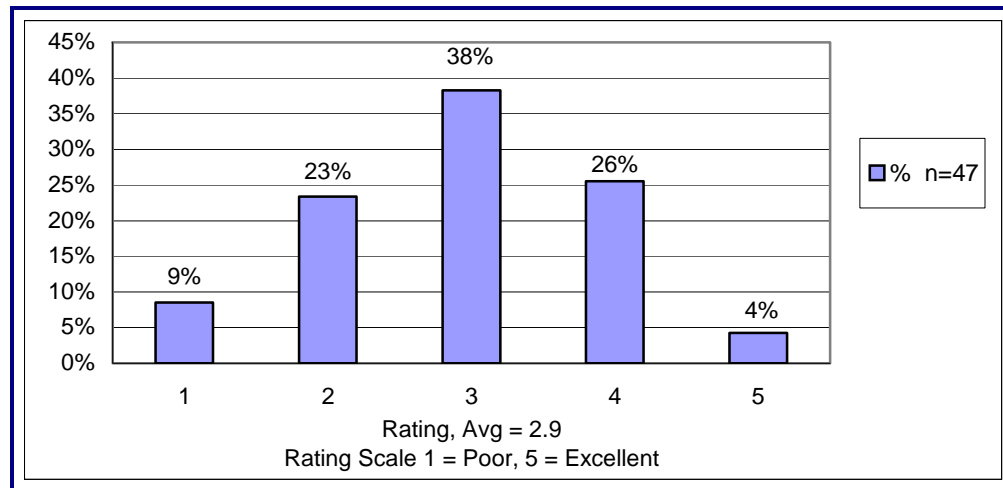
**Figure 19. Visitor Center Cyclists: quality of bicycling in the area.**





Thirty percent of Visitor Center Cyclists indicated the quality of bicycle facilities was above average or excellent, compared to 51 percent for the Intercepted Visitor Cyclists (average rating of 2.9 and 3.6 respectively).

**Figure 20. Visitor Center Cyclists: quality of bicycle facilities in the area.**



#### Investment Priorities

- Seventy percent of Visitor Center Cyclists indicated additional facilities should be built in the area.
- Eighty-eight percent of Visitor Center Cyclists favored the use of state and/or federal funds to build such facilities.
- The top priorities visitors gave for improving bicycle facilities were, in order of importance: More Bike Paths, More Bike Lanes, Off-road Trails, Public Restrooms, and More Trails.

#### Spending Patterns

The bicycling respondents to the Visitor Center Survey spend slightly more than the visiting respondents to the Intercept survey--\$175 per person per day versus \$150. The details shown in the table below may be compared with the Intercepted Visitor Cyclist list of expenditures in Table 5.

**Table 6. Visitor Center Cyclists: list of expenditures per visitor per day.**

Expense Category	Expenditure (\$ per person per day)
Accommodations	72
Restaurants/fast food/bar	33
Groceries/beverages/snacks	21
Retail/shopping	21
Recreation/entertainment	20
Bicycle accessories/equipment	N/A
Car/fuel	8
<b>Total</b>	<b>\$175</b>

## Bed & Breakfast and Campground Owners Survey

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Surveys related to bicycling were sent to 23 owners of Bed and Breakfast establishments (B&B's) and campgrounds in the northern Outer Banks. Because only six owners responded, the data are not statistically significant but may be useful anecdotally. A summary of the results of this survey is included as Appendix E (page 61). A copy of the questionnaire is included in Appendix G (page 76).

## Bicycle Traffic Counts

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In order to develop an estimate of total usage of bicycle facilities in the area, bicycle traffic counts were conducted on bicycle facilities throughout the area. Data were collected over a seven-day period, for 24 hours each day, at eleven separate locations. (See the detailed maps in Appendix A on page 45.) Pneumatic tube counters, similar to those used to count vehicle volumes on a street or highway, were placed perpendicular to the direction of travel on three shared-use paths and on eight roadway shoulder locations to physically count users of the facilities. They were calibrated to detect two “pulse” compressions of air in the tube within a certain time-interval - the two wheels of a bicycle going over the tube tripped the sensor while a pedestrian did not. The number of bicyclists per hour was recorded by a small device attached to the pneumatic tube. Counts were recorded hourly from July 29 to August 4, 2003, for 24 hours each day at each counter. The tubes used on the shoulders were placed in pairs on opposite sides of the roadway so information could be collected for each direction of travel. The photos below show the tube and counter installation. (See Appendix B - Methodology, on page 49, for more details.)

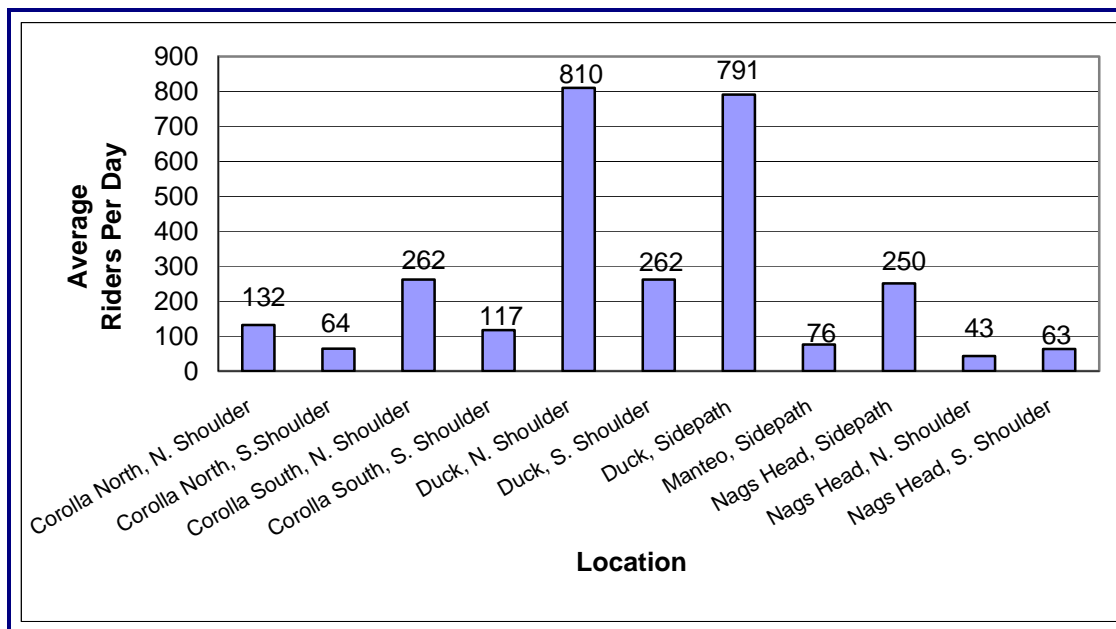


*Left:* Example of pneumatic tube across a wide paved shoulder. Note the sign alerting cyclists to the counter ahead. Photo courtesy NCDOT  
*Above:* A close-up of the sensor itself, which stores the number of counts per hour per day. Photo courtesy ITRE

It should be noted that the charts below reflect raw count data. These data simply show the number of times the counting devices were activated. They have not been adjusted to account for two-way trips, counts registered by something other than bicycles, or the possibility that riders on a long trip would cross more than one counting device. In addition, they do not reflect the fact that many of the same riders made trips on multiple days. None the less, the raw data counts provide evidence that there is significant usage of the bicycle facilities.

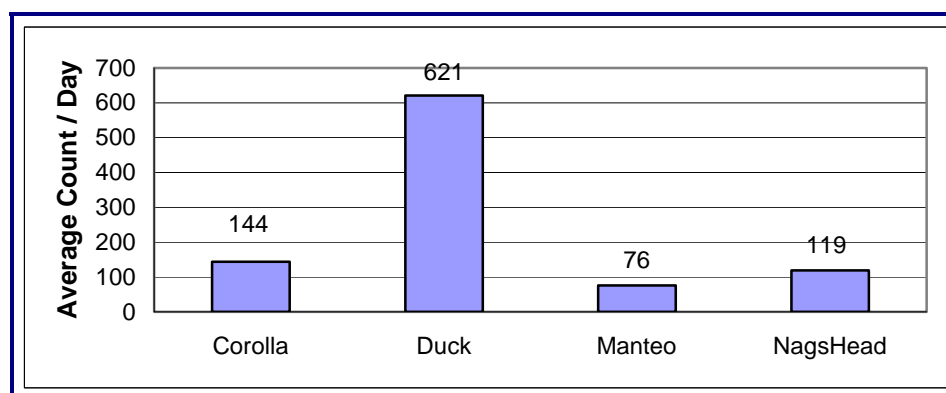
Figure 21 and Figure 22 below show that the popular tourist town of Duck accounted for a large proportion of the bicycle traffic measured by the counters. More specifically, the following chart shows the average daily bicycle traffic count at each of the eleven counting locations.

**Figure 21. Bicycle traffic counts: average count per day by counter location.**



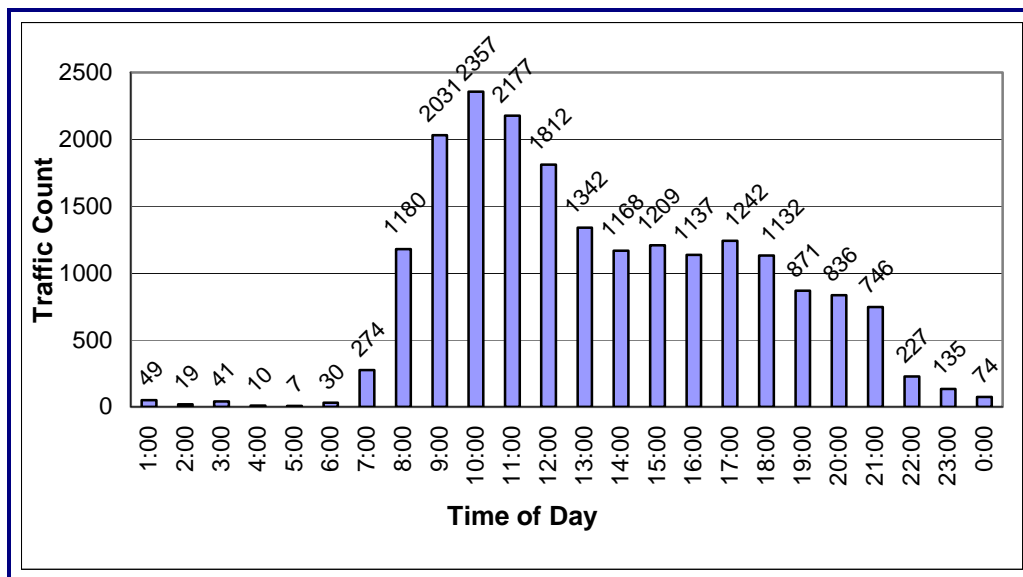
The chart below summarizes these data by town (the total counts in each town divided by the number of counters in that town):

**Figure 22. Bicycle traffic count: average count per day by town.**



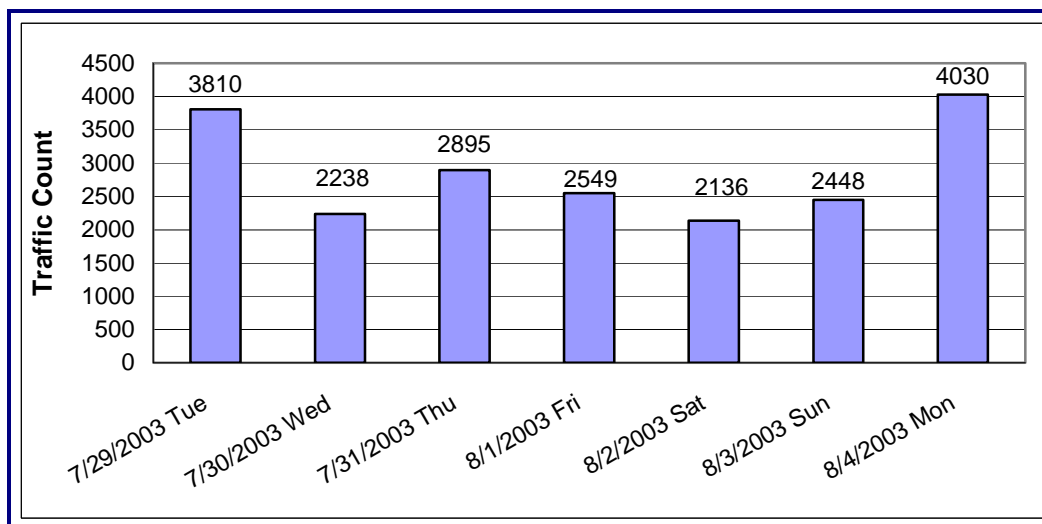
As shown below, morning hours appear to be the most popular hours for bicycling, hitting a peak about 10:00 AM. Counts diminish as the lunch hour approaches. The afternoon holds steady at about one-half of the morning peak level until about 7:00 PM. Not surprisingly, it drops significantly after 9:00 PM (shortly after it gets dark at that time of year).

**Figure 23. Bicycle traffic counts: total counts per hour of day (peak usage times).**



As for days of the week, the chart below shows that bicycle ridership was highest on Monday and Tuesday of the week studied and was relatively stable for the rest of the week. Visitors who rent homes or condominiums typically check in or check out on Saturday or Sunday, which may account for the low bicycling volumes on those days.

**Figure 24. Bicycle traffic counts: total counts per day.**



The traffic count data described above is just that—traffic count data. For a number of reasons, these counts are substantially higher than the number of actual individuals who were bicycling. For example, most individuals were making a round trip and were therefore counted twice. In addition, those on long trips would have activated multiple counters, and those who rode on several days would have been counted on each day. Therefore a number of adjustments were made to translate the count data into an estimate of the actual number of individuals involved.

Over the seven-day, 24-hour period, 20,106 raw total counts were recorded. In order to account for the overestimation of how many individual people were actually bicycling on the facilities, the raw traffic data counts were divided in half (assuming most trips were round-trip), and then further decreased to account for cyclists tripping multiple counters on long rides. (These adjustments are described in more detail in Appendix B on page 51.) After making these adjustments, the estimated number of individuals using these bicycle facilities daily is approximately 737 cyclists. Note that although the surveys suggest a proportion of visitor versus resident cyclists may be determined, there is no way to know whether this ratio holds true with the trip counter data. In other words, of the 737 average daily cyclists, it is unknown how many are visitors versus residents.

In order to figure out a total annual estimate of individuals taking advantage of the bicycle facilities, the Outer Banks Visitors Bureau room occupancy data were used so that monthly estimates would correspond with the fluctuation of tourist seasons. The primary tourist season at the Outer Banks is from May 10 to September 15. Annually, approximately 85,360 individual cyclists use the bicycle facilities in the northern Outer Banks, according to the traffic counts and the room occupancy data. Roughly 80 percent (68,313 people) of these individuals use the facilities during the primary tourist season.

It is prudent to point out that not all bicycle facilities in the northern Outer Banks were outfitted with the traffic counting devices. Another variable not accounted for is the concept that one individual cyclist may use a bicycle facility more than one day per year, depending on how frequently he/she bicycles and, for a visiting cyclist, how many vacations he/she takes to the northern Outer Banks over a twelve month period. These issues may modify the annual number of individual cyclists calculated above. Because there are so many assumptions and adjustments involved with determining the true annual number of individual visiting bicyclists, another method for estimation was used to perform the Economic Impact Analysis, which is discussed in the following section.



## V. STUDY RESULTS - ECONOMIC IMPACT ANALYSIS

The underlying purpose of an Economic Impact Analysis (EIA) in a study like this is to determine the effect on the local economy of visitors or tourists who are drawn to an area by a particular attraction or event. For example, something like Mount Rushmore attracts many tourists to an area, as does an event like the Super Bowl. When tourists visit an area they spend money—on lodging, food, entertainment, and other items. These expenditures provide income to the owners and employees of lodging facilities, grocery stores, restaurants, retail stores, and other commercial establishments. In turn, the owners and employees spend this income on similar things, resulting in what economists call a “multiplier” effect. In other words, a dollar spent passes through many hands (is re-spent), resulting in an overall economic impact greater than one dollar.

In many areas, tourism is an important industry and a mainstay of the local economy. Cities and states often compete vigorously to attract tourists because of this economic benefit. In addition to the income generated by the private sector, this economic activity also increases state and local taxes, particularly sales and income taxes, thereby providing important revenues to state and local governments.

Often it is not too difficult to develop an estimate of how many tourists come to an area because of a particular attraction or event, e.g., Mount Rushmore or the Super Bowl. Tickets are sold. Hotels fill up. There are usually specific indicators such as these that can be used to estimate how many people came for the specific attraction or event. However, in this case study there are a number of reasons to visit the Outer Banks, the obvious ones being beach- or ocean-related, not bicycle-related. Even if tourists come for bicycling, are they attracted by the overall quality of bicycling in the area (e.g., flat terrain, scenic views, and temperate climate), or by the quality of the bicycle facilities that are available (wide paved shoulders, multi-use paths, etc.)? The answer is probably not one or the other but some combination of both. No matter how scenic or flat, bicyclists are not likely to be attracted to an area where the bicycling is difficult or unsafe.

In order to deal with these issues, several questions were included in the surveys that were designed to help us determine the extent to which bicycling in general, and bicycle facilities in particular, were important in the decision to visit the area. These questions were:

1. How important was the activity of bicycling in your decision to come to this area?
2. How would you rate the overall quality of bicycling in the area?
3. How would you rate the overall quality of bicycle facilities in the area?
4. How important will the quality of bicycling be in a decision for you to return to the area at a later date?

Each of the questions could be answered on a scale of one to five (1-5), with 1 being Not Important/Poor/Not a Factor and 5 being Very Important/Excellent/A Great Deal. This information was used to assess the degree to which some of the economic benefit accruing from the tourists could be reasonably attributed to bicycling, or to bicycle facilities.

Three key types of information were needed for this purpose:

1. The average amount of money that the tourists spend while on their trip (and what they spend it on).
2. The total number of tourists.
3. The proportion of these tourists that were strongly influenced to visit by bicycling in general, or by the availability of bicycle facilities in particular.

Because of the uncertainties mentioned above, and the inherent difficulty of developing a precise estimate in this kind of analysis, it was decided to develop a range of estimates of bicyclists for whom it could reasonably be argued that they were strongly attracted to the Outer Banks by bicycling. Certain assumptions

were developed, based on state and local tourism information. According to the North Carolina Department of Commerce' *Domestic Region Travel Study*, approximately 11 million tourists visited all North Carolina coastal areas in 1999. Information from the Outer Banks Chamber of Commerce indicated that seven million tourists visit the Outer Banks each year. Information was not available on the actual number of visitors to the northern Outer Banks, the area of study. It is safe to assume, however, that at least four million tourists visit this part of the Outer Banks as it is substantially more developed and has more tourist attractions, accommodations and amenities than other Outer Banks destinations.

Surveys conducted in the three visitor centers in the northern Outer Banks revealed that 17 percent of the general tourists do some bicycling while on their trip there. Seventeen percent of 4,000,000 results in 680,000 tourists. Obviously, only some of these tourists were influenced to come to the Outer Banks primarily because of bicycling, or more specifically because of the bicycle facilities available. Therefore three estimates of tourists who were likely to have been attracted to a significant degree to the Outer Banks by bicycling were developed —a high, medium and low estimate.

The *high estimate* was based on the percentage of bicycling tourists who gave a rating of five (Very Important) to the question "How important was the activity of bicycling in your decision to come to this area?" This was 15 percent of the bicycling tourists. Fifteen percent of 680,000 tourists leave 102,000 tourists.

The *mid-range estimate* was developed by reducing the high estimate by the percentage of bicycling tourists who not only answered a five on the above question, but also gave a rating of four or five to the question "How would you rate the overall quality of bicycle facilities in the area?" The intention of this step was to narrow the estimate down to only those bicycling tourists who were not only familiar with the bicycling facilities in the area but who also had a very favorable opinion of them. This reduced the high estimate by another 40 percent, to 40,800 bicyclists.

The *low estimate* was intended to provide an absolute "bedrock" number. It includes only those respondents who gave a rating of five to the above two questions, and who also gave a rating of five to the additional question "How important will the quality of bicycling be in a decision for you to return to this area at a later date?" This step reduced the medium estimate by another 25 percent, to 10,200 annual bicyclists.

The surveys also determined the average amount of money spent per person per day while on their trip (on accommodations, meals, recreation, shopping, etc.), and the average number of days on the trip. This allowed the calculation of the annual amount of money spent by the bicycling tourists for each estimate, which is summarized in the following table:

**Table 7. Estimated annual expenditures for bicycling tourists on the northern Outer Banks, based on survey data.**

<b>\$/person/day</b>	<b>Average Days on Trip</b>	<b>High Estimate Annual \$</b>	<b>Mid-range Estimate Annual \$</b>	<b>Low Estimate Annual \$</b>
\$175	8.3	\$145.0 million	\$58.0 million	\$14.5 million

Finally, the annual expenditure amounts were analyzed by an economic impact computer model (IMPLAN) at North Carolina State University that estimates the economic impact of these expenditures. The model provides economic impact estimates based on data specific to the Dare County area by using the annual expenditures of tourists and adjusting these expenditures to reflect two concepts:

- Not all the money spent there stays there. An amount estimated at 22 percent flows outside the county in the form of federal and state taxes and contributions.
- The money that is spent gets re-spent and produces what is known as a "multiplier effect." For example, money spent on motel accommodations ends up in the paychecks of the motel employees. They spend part of it on groceries. That money ends up in the paychecks of grocery store employees. And so on. The estimated multiplier effect for Dare County is 1.32.



The economic impact calculation is therefore:

$$\text{Total Spending} \times 0.78 \times 1.32$$

Similarly, the computer model estimates the number of jobs produced by these expenditures by including a “job multiplier effect.” For Dare County, it is estimated that 31.1 jobs result from every \$1 million spent. The number of jobs created or supported through tourist expenditures is therefore calculated:

$$[(\text{Total Spending} \times 0.78) / \$1 \text{ million}] \times 31.1$$

The resulting economic impact analysis outcomes for the high, mid-range, and low estimates are summarized in Table 8. The mid-range estimate of an annual economic impact of \$60 million and 1,400 jobs supported was chosen as a conservative and justifiable middle ground; however, a good case could be made for the higher estimate.

**Table 8. Varying estimates for numbers of riders, jobs created and/or supported, and the overall economic impact, annually, based on conservative to high ranges.**

Estimate	Estimated Number of Riders Annually	Annual Economic Impact	Number of Jobs Supported Annually
High Estimate	102,000	\$149 Million	3,517
Mid-range Estimate	40,800	\$60 Million	1,407
Low Estimate	10,200	\$15 Million	352

The Visitor Center survey also asked the question: “Did the activity of bicycling make the duration of this trip longer (more days) than if biking wasn’t involved? If yes, by how many days?” This information was used to determine the economic impact of just these extra days. Interestingly, the result was \$59.1 million, almost identical to the mid-range estimate above.

A natural question that arises is how these benefits compare to the cost of constructing the bicycle facilities that were built in the area. Table 3 on page 14 notes the total cost of these facilities was \$6,727,303. (It should be noted that the costs are for the most part one-time capital expenses while the benefits are on-going annual amounts.)



## VI. CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

The literature review revealed that tourism is an important resource for North Carolina, as it is for many other states. The primary reason, of course, is that tourists spend money that benefits both the state and local economies. The economic impact of such expenditures is large and varied, and it benefits businesses, workers, and state and local governments.

Because of this favorable economic impact, competition for tourist dollars is strong. The competition occurs between states and between areas within a state. Tourists can be drawn to an area by specific attractions, such as the beaches, but also by the complex mix of things that provide a variety of things to see and do. The richer the mix, the stronger the draw. Bicycling can obviously be one ingredient of the mix. For it to be significant, attention must be paid to making an area “bicycle-friendly.” This means, among other things, providing bicycle facilities, such as bicycle paths, bicycle lanes or wide paved shoulders on roads, to make the overall cycling experience convenient, pleasurable and safe.

Although it is difficult to determine the proportion of tourists who come to an area like the Outer Banks primarily because of bicycling, it is fair to say that bicycling is one of the important factors in the decision by many people to visit. In regard to distinguishing those who are attracted by the quality of bicycling in general from those who are attracted by the quality of the bicycle facilities in particular, it is also fair to say that both factors are probably at play in varying degrees for different individuals or groups.

The findings of the South Carolina study regarding its coastal area applies equally well to North Carolina, i.e., South Carolina coastal areas are well-suited for attracting bicycling tourism because of their level terrain, year-round temperate climate, availability of rural roads with low traffic densities, and variety of natural and manmade attractions easily accessible by bicycle (See References listed within the Literature Review on page 10 for more information.)

The South Carolina study cited in the literature review makes it clear that South Carolina intends to compete more vigorously for coastal bicycle tourists. It can be assumed that Virginia is another nearby state that competes with North Carolina for tourist business including tourists who bicycle. Although improving bicycle facilities may not be the main reason that tourists will be drawn to the Outer Banks or other coastal areas, they may well be an important ingredient in the complex mix of factors that induce tourists to choose North Carolina coastal areas over other nearby states.

Bicycling is clearly an important activity in the northern Outer Banks. Observation alone would suggest this—many bicyclists can be seen on the streets, roads and multi-use paths throughout the area. There are also many parked bicycles in evidence at beach locations, and in shopping and dining areas. In addition, a significant proportion of motor vehicles in the area can be seen to have bicycle racks. However, it can also be intuitively assumed that bicycling is not the dominant reason for visiting the area. Clearly, beach and ocean-related activities would be more important reasons for most tourists to visit.

The visitor center surveys revealed that about 17 percent of tourists, or about 680,000 annually, engage in some bicycling activity while in the area. Approximately one-third of these bicyclists indicated that it was an important factor in their decision to visit. The quality of bicycling in the area was rated fairly high by survey respondents, as was the quality of bicycle facilities. Scoring even higher was the perception that the bicycle facilities added to the cyclists’ feeling of safety while riding. Finally, many survey respondents indicated that the quality of bicycling would be important in their decision to return to the area.

It should also be recognized that bicycling is important not just for the tourists. Many residents also benefit by the presence of the bicycle facilities and use them for purposes of exercise (46%), recreation (32%),

and personal errands (11%). Four percent of residents indicated that their bicycle trip was for the purpose of commuting to work or school.

The following table provides the average rating given to key survey questions by the three types of respondents. (In the survey, a respondent could rate an item from 1 – 5, with 1 being Not Important/Poor/Not a Factor, and 5 being Very Important/Excellent/A Great Deal, depending on the question.)

**Table 9. Comparison of the quality of bicycling, facilities, and feeling of safety across three respondent categories.** Note: Visitor Center Cyclists are likely to have been at the beginning of their visit and therefore may not have yet had a chance to actually experience the quality of bicycling or bicycle facilities in the area.

Survey Question	Intercepted Visitor Cyclists	Visitor Center Cyclists	Intercepted Resident Cyclists
Importance in decision to visit area	3.1	2.8	N/A
Overall quality of bicycling	3.7	3.1	3.3
Quality of bicycle facilities	3.6	2.9	3.5
Feeling of riding safety due to bicycle facilities	3.8	3.4	4.0
Importance in decision to return	3.5	3.0	N/A

Another factor that indicates that bicycling is important in terms of visiting the area is that 70 percent of the Intercepted Visitor Cyclists, and 62 percent of the Visitor Center Cyclists, stated that they had brought their own bicycles. In addition, the average Intercepted Visitor Respondent bicycled on 69 percent of the days of his or her trip, with 75 percent reporting that they bicycled on more than 50 percent of the days of their visit. Finally, 11 percent of the Intercepted Visitor Respondents and 16 percent of the Visitor Center Cyclists stated that their visit duration was longer due to bicycling, by an average of three and four days respectively.

Interestingly, a higher percentage of both Intercepted Visitor Cyclists and Visitor Center Cyclists said that bicycling would be more important to their decision to return to the area than it was in their decision to come. This suggests that once exposed to the quality of bicycling in the area, visitors are more likely to return.

The economic impact of this number of visitors is obviously significant. In addition, the impact of the investment in the bicycle facilities also creates a significant economic impact in terms of money spent, and jobs created or supported. A reasonable mid-range estimate is an economic impact of at least \$60 million per year.

A large percentage of bicyclists indicated that additional facilities should be built in the area—76 percent of Intercepted Visitor Cyclists, 70 percent of Visitor Center Cyclists, and 91 percent of Intercepted Resident Cyclists. Even larger proportions favored the use of state and/or federal funds to build such facilities—95, 88 and 100 percent, respectively. In terms of the kinds of facilities most desired, the following table summarizes the survey responses, in order of priority.

**Table 10. Comparison of bicycle facility investment priorities among the three respondent categories.**

Top Five Bicycle Facility Investment Priorities			
Priority	Intercepted Visitor Cyclists	Visitor Center Cyclists	Intercepted Resident Cyclists
1	Wider bike lanes	More bike paths	More bike paths
2	More bike paths	More bike lanes	Wider shoulders/curb lanes
3	Wider bike paths	Off-road trails	Wider paths
4	Bike path only—no walkers, etc.	Public restrooms	More paved shoulders
5	More crossing areas	Wider bike lanes	Route signs/maps

More details on the types of bicycle facilities desired are given in Appendix F (page 63).

Residents were asked about where such facilities should be located. Along NC 12 seems to be the preferred improvement location with the Duck, Kitty Hawk, Corolla, and Southern Shores areas all mentioned. Other suggestions included U.S. 158, Collington Road, Nags Head to Oregon Inlet, and every two to three miles for signs, benches, and water fountains.

The intercept and visitor center surveys did not specifically ask about desired facility locations but some suggestions did come out of the priorities listed:

- Trails inland to shore
- Pavement from Jeannette's Pier to Oregon Inlet
- Bike paths on NC 12 South of Kitty Hawk
- Connect bike paths Nags Head to Duck
- Link to Coquina Beach
- Wider shoulder on NC 12
- Widen connector between Southern Shores and Duck
- Wider sides from Duck to U.S. 158
- Bike lane on National Seashore
- Better bike path to Corolla
- Complete wide shoulders/trails along NC 12/Beach Rd
- Separate parallel lane along NC 12

## Recommendations

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The investment in bicycle facilities in the northern Outer Banks (and in otherwise supporting and encouraging bicycling as a tourist activity) has resulted in a very favorable economic return for the area. Continued investment could only be expected to increase this favorable impact and is therefore recommended. In addition, if North Carolina is to stay competitive with other nearby coastal states for bicyclists, a failure to continue investing in such facilities could prove to be harmful in the long run.

The types of bicycle facility investments found to be most desired in this study are:

- More and/or wider bicycle paths and lanes (it is realized that the geographic and development pattern constraints inherent to the Outer Banks makes the advancement of special, multi-use paths very difficult).
- More and/or wider paved shoulders on roads.

In addition, it is recommended to:

- Pursue opportunities to create connections between existing bicycle facilities wherever possible.
- Develop more bicycle lanes or paved shoulders on side streets away from the beach.
- Upgrade existing bicycle facilities where necessary and feasible to meet national guidelines and standards (4- to 5-ft width for bicycle lanes and paved shoulders, and 10- to 12-ft width for off-road paths), and build new facilities to meet these standards.
- Increase efforts to promote the use of the bicycle facilities in the area.

It is expected that investments in bicycle facilities in other areas would return similar benefits. This would be true whether the area is already a tourist attraction for other reasons, or whether the bicycle facility was itself the primary attraction, for example a dedicated bicycle path in an abandoned railroad right-of-way.

## VII. APPENDIX A: MAP DETAILS OF STUDY AREA

Figure 25. Bicycle facilities of the northern Outer Banks, from Corolla to Duck.

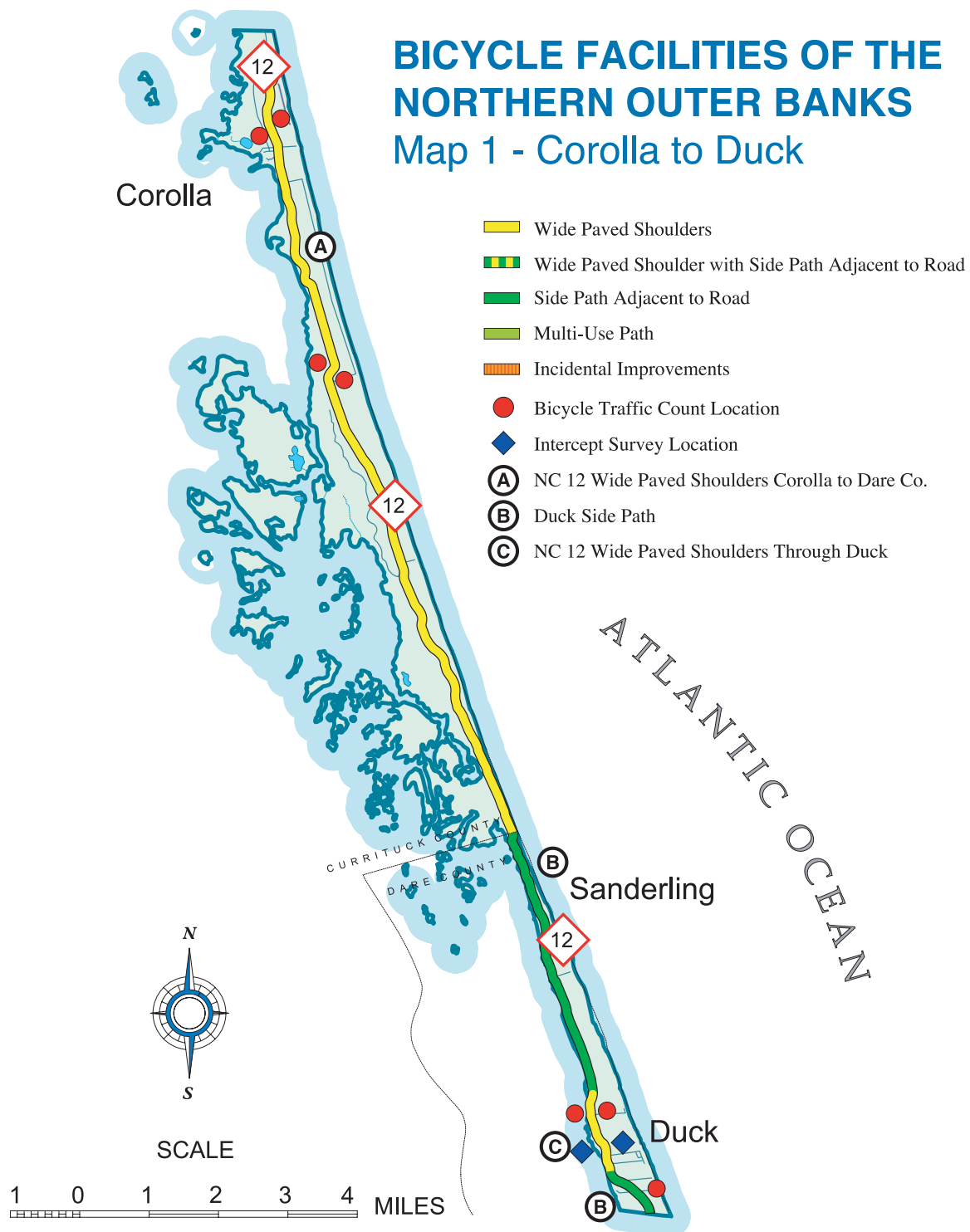


Figure 26. Bicycle facilities of the northern Outer Banks from Southern Shores to Kill Devil Hills.

## BICYCLE FACILITIES OF THE NORTHERN OUTER BANKS

### Map 2 - Southern Shores to Kill Devil Hills





Figure 27. Bicycle facilities of the northern Outer Banks from Nags Head to Manteo.

## BICYCLE FACILITIES OF THE NORTHERN OUTER BANKS

### Map 3 - Nags Head to Manteo





## VIII. APPENDIX B: METHODOLOGY

As part of the effort to determine the economic benefits of bicycling at the northern Outer Banks, surveys were conducted of five different groups:

- Visiting cyclists
- Bicycling local residents (either full-time or part-time)
- General visitors
- Owners/managers of bed and breakfast and campground facilities
- Guests at the bed and breakfast and campground facilities

Copies of the questionnaires used to collect information are attached as Appendix G (page 67).

In addition, bicycle traffic counts were conducted on bicycle facilities at eleven different locations in the area.

### Intercepted Visitor and Resident Cyclists

The survey of the first two groups was intended to provide a profile of people who actually do some bicycling at the northern Outer Banks. Information obtained included respondents' home location, where they stayed (or reside) while in the area, whether they consider themselves to be recreational or advanced cyclists, what they thought about the quality of biking in the area, and suggestions for improvements to the bicycling environment.

In order to reach these two groups, "intercept" surveys were conducted at three locations adjacent to bicycling facilities that included two wide paved shoulder locations and one multi-purpose path location. The three locations were:

- In Duck on the northbound side of NC 12 in the center of town, (in front of Scarborough Faire just north of where the multi-purpose path transitions to become a wide shoulder).
- In Duck, on the southbound side of NC 12 in the same vicinity as note above.
- In Nags Head, on the northbound side of Highway 12 (at about mile marker 16 where there is both a wide paved shoulder and a separate multi-purpose path).

These locations were chosen after a preliminary scouting of the area to determine sites that would have a sufficient amount of bicycling activity, would offer a suitable and safe place to intercept and survey bicyclists, and would provide a fair representation of typical bicycle facilities in the area. This was done in coordination with local town officials, members of local bicycling groups, and the owners of the site property where appropriate.

At each location, a table was set up at which questionnaires were distributed to bicyclists passing by who were willing to stop and fill out the questionnaire. In a few cases, questionnaires were given to the cyclist along with a business reply envelope for later return. An "awning" was erected over each table to provide some protection from sun and rain.

Passing bicyclists were encouraged to stop by preceding signs that announced that a bicycling survey was taking place ahead, and by survey staff standing nearby who verbally requested bikers to stop and fill out a questionnaire. Free bottles of cold water were offered to cyclists who stopped. Each location was staffed over a period of three days approximately as follows:

- Day One: 8:30 AM - 12:30 PM; 2:00 - 4:00 PM (abbreviated by a thunderstorm)
- Day Two: 8:00 AM to 12:00 N; 3:00 - 6:00 PM
- Day Three: 8:00 -10:00 AM (abbreviated by a thunderstorm)

In another effort to reach visiting cyclists, questionnaires were provided to two bicycle rental shops for distribution to their customers. One rental shop was in Nags Head, the other in Duck.

All questionnaires were coded by color or otherwise so that respondents could be identified in terms of the location at which they were surveyed, and their direction of travel. In total, 173 questionnaires were filled out - 143 by Intercepted Visitor Cyclists and 30 by local residents, as shown in the table below.

**Table 11. Intercept survey: Total number of visitor cyclists or resident cyclists polled at key locations.** Note: Polling numbers do not include children under age 18 for Visitors or Residents. Also, international respondents were not included in Visitor intercepts because they were long-term visitors here for work purposes.

Intercept Surveys	
Visitors	
Duck Northbound	75
Duck Southbound	22
Nags Head	46
<i>Subtotal Visitors</i>	<i>143</i>
Residents	
Duck Northbound	14
Duck Southbound	5
Nags Head	11
<i>Subtotal Residents</i>	<i>30</i>
<b>Total Intercept Surveys</b>	<b>173</b>

## Visitor Center Tourists

The intention of surveying the next group, Visitor Center Respondents, was to determine what percentage of them participate in bicycling while at the northern Outer Banks. This information in combination with the profiles of cyclists obtained above provides a more quantified estimate of the amount and importance of cycling by visitors or tourists. To reach this group, surveys were placed at three visitor centers in the northern Outer Banks--two in Manteo and one in Southern Shores. In two of the centers, the surveys were made available on the counters for visitors to fill out on location and then place in a nearby "ballot box" for subsequent collection. At one of the centers, Festival Park in Manteo, the center management agreed to place surveys and return envelopes in the bags of all visitors who purchased items from the gift shop. A total of 392 questionnaires were received from Visitor Center Respondents.

## Bed and Breakfasts Accommodations and Campgrounds

The last two groups, owners/managers and guests of bed and breakfast or campground facilities were selected because it was believed that these facilities tend to cater to guests more likely to be bicyclists than do other types of visitor accommodations. In addition, the number of such facilities involved was small enough to make the task manageable. To reach these groups, the facilities were first called to determine if the owner/manager was willing to participate in the survey. If willing, they were mailed one questionnaire for the owner/manager to complete, and a batch of questionnaires identical to those provided to general tourists for distribution to their guests. Unfortunately the number of responses by guests was very low and these have therefore not been included in the analysis. Six owners/managers responded and a summary of these responses is included as Appendix E (page 61).

## Traffic Counts

In order to obtain data on the total usage of the bicycle facilities (as opposed to developing a profile of typical users), pneumatic rubber tube traffic counting devices were used. These devices record usage on an hourly and daily basis.

Counters were put in place on Monday July 28, 2003 and collected data until Tuesday August 5, 2003. Each counter collected a full 24 hours worth of data per day from July 29 – August 4. (Note: the counters did not collect 24 hours worth of data on July 28 and August 5 and data from these days were therefore not used in the calculations.)

Eleven locations were selected for counters. Counters were placed in four localities: Manteo, Nags Head, Duck and Corolla. Manteo, Nags Head and Duck each had a counter on a side-path. All other locations were on the paved shoulders of NC 12 that were built to accommodate bicyclists. Signs were placed on the approach to the counters that said “Bicycle Traffic Count Ahead.” The table below shows the location of each counter.

**Table 12. Number of counters and their locations.**

Facility	Corolla	Duck	Manteo	Nags Head
Side path (8-10 feet wide)	0	1	1	1
Northbound shoulder (4 feet wide, paved)	2 (1 in North Corolla, 1 in South Corolla)	1	0	1
Southbound shoulder (4 feet wide, paved)	2 (1 in North Corolla, 1 in South Corolla)	1	0	1

The raw traffic count data had to be adjusted in order to translate the data from the number of times the counters were activated to an estimate of the actual number of individuals who were involved. A number of factors had to be considered. For example:

- On a given trip, most individuals were on a round trip and therefore would have been counted twice.
- On long trips, an individual may have activated several counters along the way.
- Some individuals would have activated the counters on multiple days.
- Some vehicles may have driven over the counters that were placed on road shoulders.

- Some serious bicyclists seemed to prefer riding on the road itself rather than the shoulder and therefore avoided the counters.
- Some counters were activated not by bicycles but by roller blades, baby strollers or skate boards.

The total number of counts recorded over the 24-hour seven day period was 20,106 or 2,872 average riders daily. In order to account for the potential over-estimation factors listed above, a number of adjustments were made to improve the estimate of how many bicyclists were actually using the facilities:

- Most trips are round-trip; therefore, the raw traffic count data were divided in half, to 10,053.
- An assumption was made that the counts recorded by non-bicycles was equally offset by the number of bicyclists missed by the counters because they were riding on the road itself.
- The intercept survey data were analyzed to determine the percentage of individuals who rode on multiple days (the average Intercepted Visitor Cyclist rode 5.4 days). The count data were further reduced to reflect this.
- Data from the intercept surveys were analyzed in order to determine average trip length (Intercepted Visitor Cyclists traveled an average of 7.2 miles one-way). This figure was then used to reduce the count data by the number of trips that were likely to have gone over multiple counters. Because most of counter locations were more than 7.2 miles away from each other when in different municipalities, the calculation was simplified so that the average daily count for each municipality was divided by the number of counter locations within its boundary (two counter locations for each municipality except Manteo, which had only one counter location). Therefore, the average daily count was adjusted to 737 individual cyclists.

In order to obtain an average annual number, a monthly weight for each month was determined based on the Gross Occupancy by Class 2000-2003 from the Outer Banks Visitors Bureau. The average monthly Gross Occupancy was determined from the 2000 to 2002 month Gross Occupancy numbers. Since July and August were the most heavily populated months, and the traffic data came from these months, July and August were used as the standard to weigh the averages of the other months. An average was taken of the Gross Occupancy averages for July and August and this number was used as the divisor of all the other months' Gross Occupancy averages. The sum of all the monthly estimates was totaled to provide the annual estimate of 85,360 individual cyclists.

Also using the Gross Occupancy data, an estimate of individual cyclists during the primary tourist season (May 10 – September 15) can be extrapolated. Eighty percent of the estimated cyclists annually use the bicycle facilities during the tourist season.

### Weather

Rain and thunderstorms affected survey collection at certain times on two days. Examination of radar data on those days indicated that rain did not have a significant impact on the total volume of bicycles detected. Bicycle traffic counts decreased by about one percent on days where radar showed precipitation at the counter locations.

## IX. APPENDIX C: INTERCEPTED VISITOR CYCLISTS: CYCLING DEMOGRAPHICS BY SKILL LEVEL

An analysis of Intercepted Visitor Cyclists was undertaken to determine whether, and to what extent, skill level affected cyclists' perceptions of area bicycle facilities and their preferences for visiting the area. Questions were rated on a one to five scale, one being "Not Important," "Poor," or "Not a Factor" and five being "Very Important," "Excellent," or "A Great Deal," depending on the question asked. Of the 143 respondents that completed the questionnaire (see Appendix G, "Intercepted Visitor Cyclist Survey" on page 71), twelve respondents ranked themselves as Beginner/Novice cyclists; 105 as Intermediate cyclists; and 26 as Advanced cyclists.

### Ratings by Question and Skill Level

Overall, the view of cycling in the northern Outer Banks by visitors was positive. Table 13 below compares the responses by skill level. Only three average rating scores by skill level were less than three on a five-point scale with five being the most positive ranking. One of those scores was 2.6 and the others were 2.9. The 2.9 ratings were Safety Value according to Advanced riders and Return Value according to Novice riders. Both are understandable when considering the skill level and the question. The 2.6 rating from Novice level riders was for the importance of bicycling in the decision to come to the area.

**Table 13. Intercepted Visitor Cyclists: Comparison among skill level for ratings by question and demographic results.** Scale: 1 = not important, poor, or not a factor; 5 = very important, excellent, or a great deal.

Question	Beginner/ Novice	Intermediate	Advanced	Overall
Decision to come to area related to cycling, average rating	2.6	3.1	3.2	3.1
Quality of cycling, average rating	3.7	3.8	3.4	3.7
Facilities quality, average rating	3.2	3.8	3.1	3.6
Safety value, average rating	3.7	4.1	2.9	3.8
Return value due to cycling, average rating	2.9	3.6	3.3	3.5
Trip Longer Responses, % within skill level	8%	10%	19%	11%
Average Days Longer	NA	3.5	2.0	3
Average Age	39.1	44.9	45.3	44.7
Male	50%	48%	69%	52%
Female	50%	52%	31%	48%

Cycling Importance: Intermediate and Advanced riders gave an average rating of 3.1 and 3.2 for the importance of bicycling in their decision to come to the area. Novice cyclists gave an average rating of 2.6, indicating that bicycling was a factor in deciding to come to the northern Outer Banks, but not an important one.

Facilities Quality: Intermediate riders rated the quality of bicycling facilities rather high at 3.8 out of five. The average rating of facilities quality by Beginner/Novice and Advanced riders is very close together, 3.2 and 3.1 respectively, indicating facilities were good.

Safety Value: Beginner/Novice and Intermediate level riders rated the feeling of safety they get from the bicycle facilities highly, at an average rating 3.7 and 4.1 out of five, respectively. Advanced riders ranked safety lower, with an average rating of 2.9. This may be due to Advanced riders being more likely than other riders to choose to ride on the road rather than bike paths, and that they do not like to use multi-use paths. They tend to view the multi-use paths as less safe due to potential conflicts with pedestrians and slower (beginner/novice) cyclists. It is also likely that they ride at higher speeds, thus putting them at more risk, especially in congested areas.

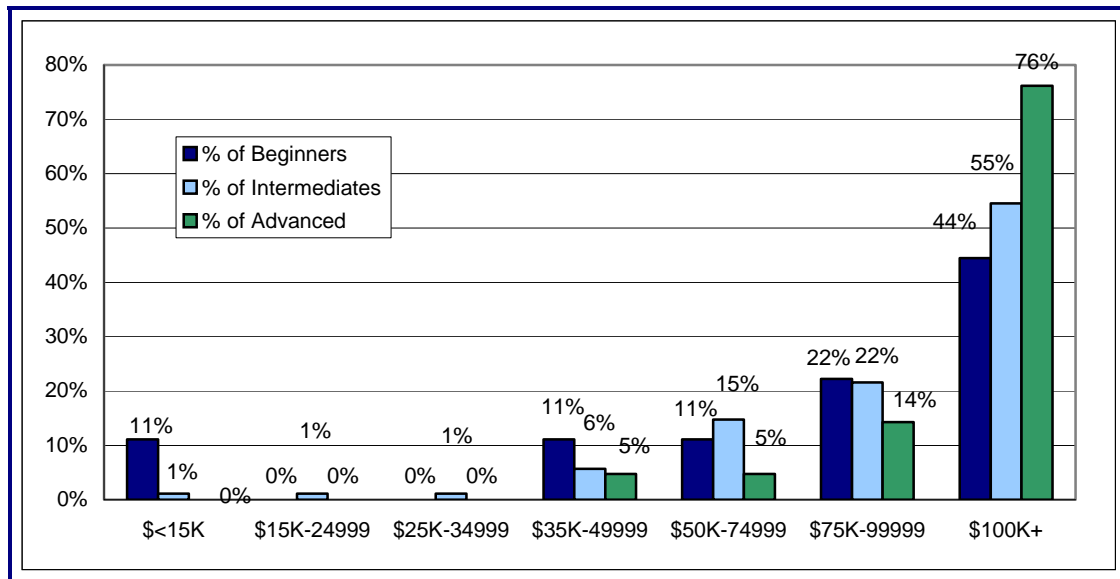
Return Value: Intermediate and Advanced level riders had a positive view of the value of returning to the area because of the quality of bicycling, with average ratings of 3.6 and 3.3 out of five. Novice riders gave an average rating of 2.9, meaning the quality of cycling would be a slightly less than moderate draw to return to the area, but it was still a factor. As these riders still consider themselves Novices, their commitment to cycling is likely to be lower than Intermediate and Advanced skill level riders. As was seen above, bicycling for new riders was not a very important factor in deciding to come to the area in the first place. While it is still not a very important part of the decision to return, the importance level did rise in comparison to the original decision. This can be seen in 42 percent of Novice riders rated Bicycling Importance as a one (not important to their decision to come to the area), and 27 percent gave a rating of one in Return value (not a factor in their decision to return to the area).

The following charts are included to help visualize the survey results by skill level for several demographically related data sets:

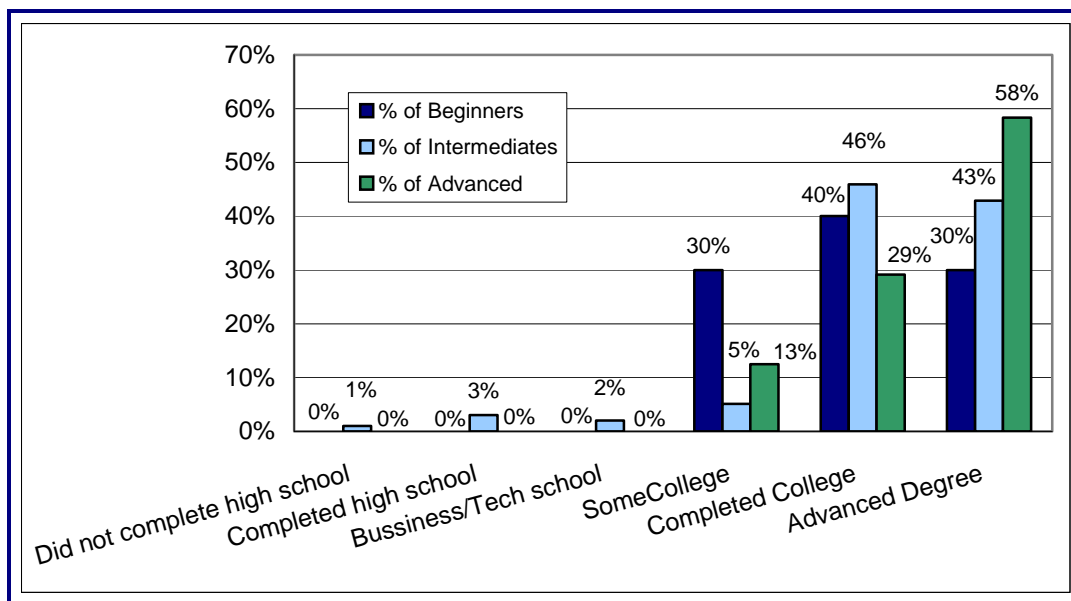
- Income
- Education
- Ratings of Cycling Importance
- Ratings of Facilities Quality
- Ratings of Safety Value
- Ratings of Return Value



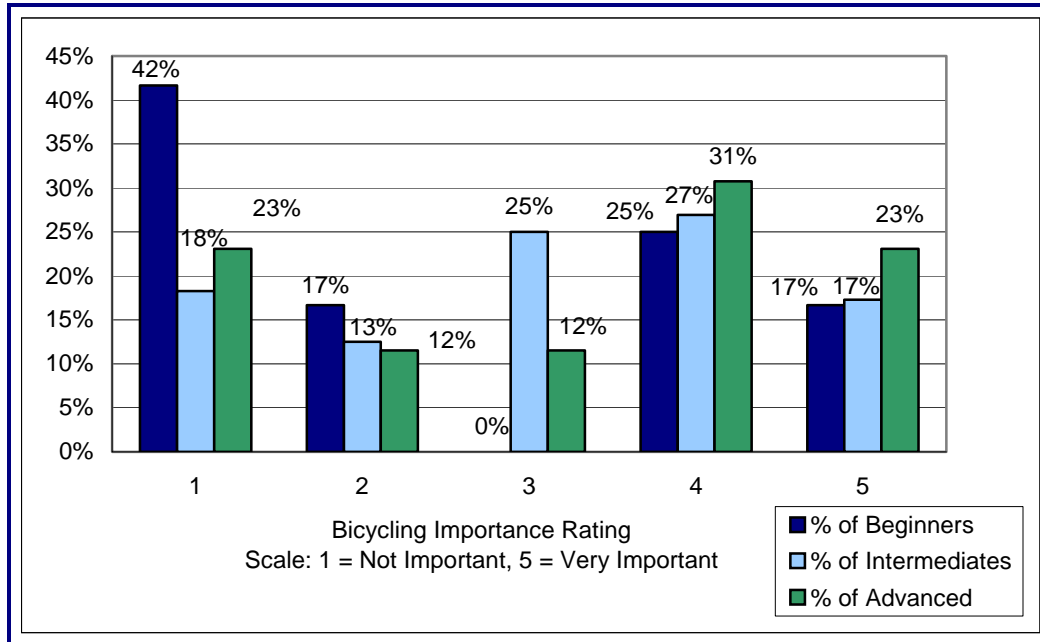
**Figure 28. Intercepted Visitor Cyclists, by skill level: household incomes.** Interestingly, the higher skill levels also have the highest incomes.



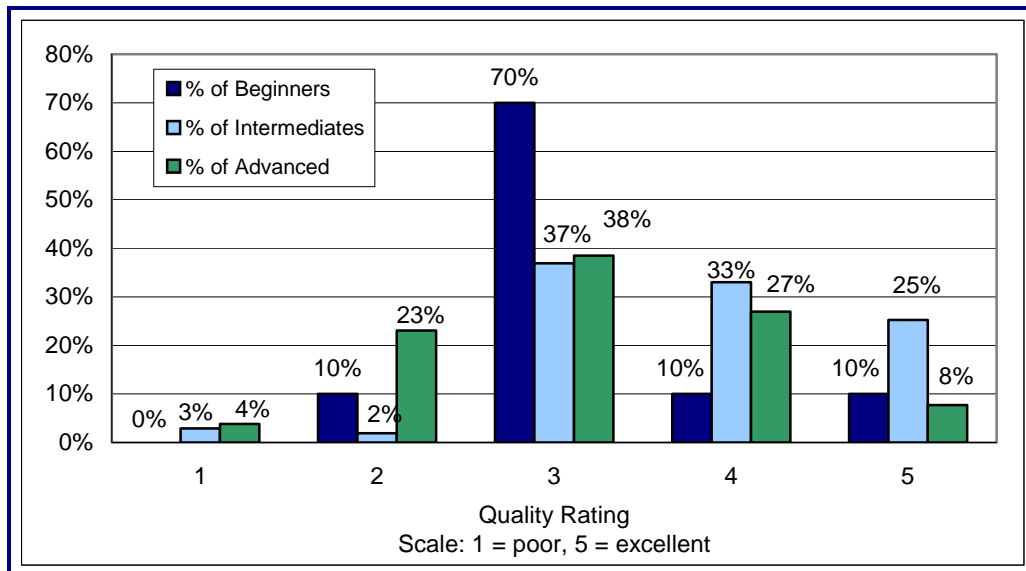
**Figure 29. Intercepted Visitor Cyclists, by skill level: education level.** Similarly, the Advanced cyclists have the highest level of education.



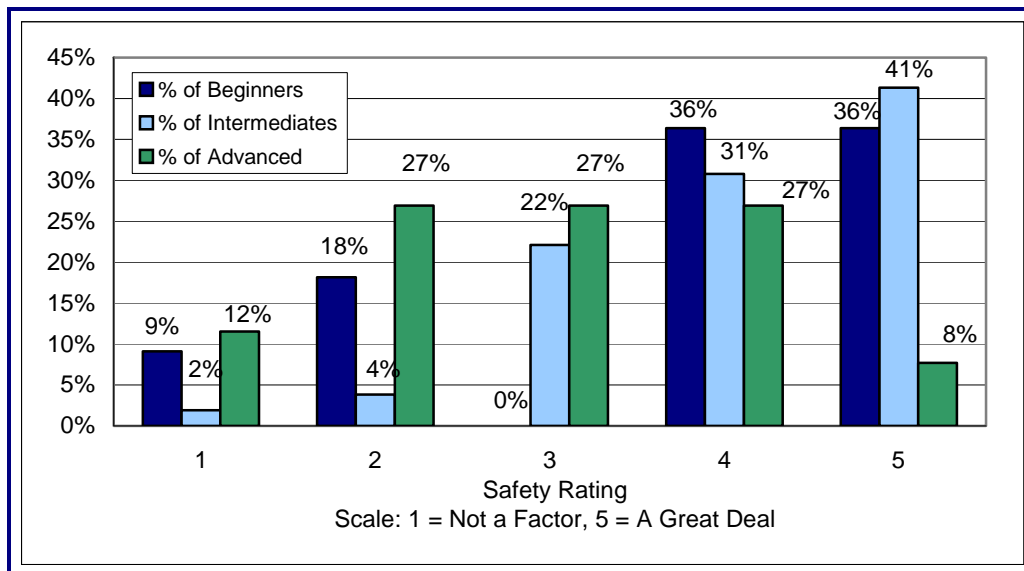
**Figure 30. Intercepted Visitor Cyclists, by skill level: importance of bicycling in decision to come to northern Outer Banks.** Bicycling is not as important a factor in deciding to come to the northern Outer Banks for Beginners/Novices.



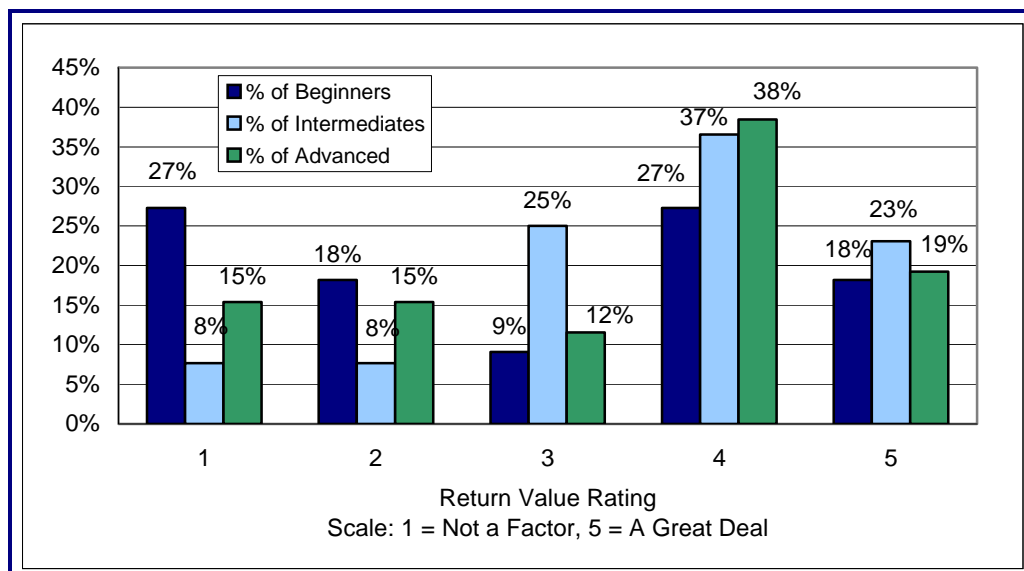
**Figure 31. Intercepted Visitor Cyclists, by skill level: rating of quality of bicycle facilities.** Intermediate riders seem to rate the quality of bicycle facilities the highest.



**Figure 32. Intercepted Visitor Cyclists, by skill level: rating of feeling of safety on bicycle facilities in the area.** The feeling of safety provided by the bicycle facilities is an important factor although not so much so for the Advanced cyclists.



**Figure 33. Intercepted Visitor Cyclists, by skill level: importance of bicycling in decision to return to the area.** Bicycling is a relatively important factor in decisions about returning to the area. However, it is less so for Beginners/Novices.



Some additional highlights by skill level are listed below:

**Beginner/Novice Skill Level: (12 respondents)**

- Fifty percent ride less than ten miles/month. The other 50% ride 10-49 miles/month.
- Eight percent indicated that cycling made the duration of their trip longer, but the respondents did not indicate by how many days.
- The average age was 39.1, low of 18, high of 61.
- Fifty percent were male, 50% female.
- The top five priorities for facility improvements were More Bike Paths (26%), Wider Bike Paths (24%), Signs alerting drivers of cyclists (18%), Bike Paths to the Sound (13%), and Bike Paths to neighborhoods (11%).

**Intermediate Skill Level: (105 respondents)**

- Twenty-four percent ride less than ten miles/month, 37% ride 10-49 miles/month, 27% ride 50-99 miles/month, 8% ride 100-199 miles/month, and 5% ride 200 miles or more per month.
- Ten percent indicated that cycling made the duration of their trip longer, with an average of 3.5 days longer (range of 2 to 7 days).
- The average age was 44.9, low of 18, high of 70.
- Forty-eight percent were male, 52% female.
- The top five priorities for facility improvements were More Bike Paths (19%), Wider Bike Lanes (11%), More Bike Lanes (7%), Wider Bike Paths (7%), and Cross Walks (4%).

**Advanced Skill Level: (26 respondents)**

- Seventy-three percent ride 200 or more miles/month, 27% ride 100-199 miles/month.
- Nineteen percent indicated that cycling made the duration of their trip longer, with an average of two days longer.
- Average age was 45.25, low of 35, high of 61.
- Sixty-nine percent were male, 31% female.
- The top priorities for facility improvements were Wider Bike Lanes (32%), More Bike Paths (23%), Wider Bike Paths (4%) & Water Stations (4%), Cross Walks (4%) & Signs alerting drivers of cyclists (4%), and Educate motorists to “Share the Road” (3%).

## X. APPENDIX D: INTERCEPT SURVEY OF LOCAL RESIDENTS

Although residents do not enter into an economic impact analysis because they do not bring new money into an area, there is nonetheless a benefit created for the residents by the availability of bicycling facilities. Therefore, residents were included in the intercept surveys. A summary of their survey responses to several rating questions follows. Thirty residents filled out surveys.

**Table 14. Intercepted Resident Cyclists: average ratings for quality of cycling and facilities and feeling of safety in the area.**

Question	Average Rating	Rating Scale
Overall Quality of Bicycling	3.3	1 = poor, 5 = excellent
Overall Quality of Bike Facilities	3.5	1 = poor, 5 = excellent
Bike Facility Existence Provided Feeling of Safety	4.0	1 = not a factor, 5 = a great deal

### Demographics

- Fifty-six percent of Residents were Permanent Residents, 44% were Part-Time.
- Part-Time Residents also live in Virginia (25%), Maryland (25%), New York (17%), and Pennsylvania (17%). This is very similar to the primary origins of the visiting bicyclists.
- Resident ages were 22-73 with an average of 49.5.
- Exactly 62.5% of respondents were male, 37.5% were female.
- The most frequent household incomes of residents were \$50,000-\$74,999 (41%), \$100,000 or more (35%), and \$35,000-\$49,999 (12%).
- Completed College (46%) and Advanced Degree (42%) were the education levels with the highest number of responses. The percent of advanced degrees is identical for residents & visitors.

### Bicyclists' Characteristics

- Forty-eight percent of residents bike 3-5 days/week, 30% bike 6-7 days/week.
- Fifty-four percent of resident cyclists rated themselves at the Intermediate/Recreational level, 39% answered they were Advanced/Serious, and 7% answered they were Beginner/Novice.
- Thirty-three percent of resident cyclists bike 10-49 miles/month, 22% ride more than 200 miles/month, 19% ride 50-99 miles/month, 15% ride 100-199 miles/month, and 11% ride less than ten miles/month.

## **Trip Information**

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- The three most common purposes for bicycle trips were Exercise (46%), Recreation (32%), and Personal Errands (11%).
- Resident starting points were concentrated in or near Duck (53%), Southern Shores (24%), Kitty Hawk (12%), Nags Head and Roanoke Island (both 6%), as might be expected due to the proximity to the survey locations.
- Destinations for Residents included Duck (56%), Nags Head and Corolla (both 17%), Southern Shores and Kill Devil Hills (both 6%).
- Rides averaged 18.2 one-way miles for residents, and ranged from 1.5 to 45 miles.

## **Bicycle Facilities Investments**

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- Ninety-one percent of residents indicated additional facilities should be built in the area.
- One hundred percent of residents favored the use of state and/or federal funds to build facilities.
- The top five priorities residents gave for improving bicycle facilities were, in order of priority: More Bike Paths, Wider Shoulders, Wider Paths, More Paved Shoulders, and Bike Route Signs/Maps.

## **Facility Investment Locations**

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Residents were asked about where bicycle facilities improvements should be located. NC 12 seems to be the preferred improvement location with the Duck, Kitty Hawk, Corolla, and Southern Shores areas all mentioned more than once. Other individual suggestions included U.S. 158, Collington Road, Nags Head to Oregon Inlet, and every two to three miles for signs, benches, and water fountains.

## **XI. APPENDIX E: SURVEY OF BED AND BREAKFAST AND CAMPGROUND ESTABLISHMENTS**

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Surveys related to bicycling were sent to 23 owners of Bed and Breakfast (B&B) and campground facilities in the northern Outer Banks. As only six owners responded, the data are not statistically significant but may be useful anecdotally.

Five of the responses were from B&B owners; the other was not identified as campground or B&B. One of the establishments was closed from December to February; all others were open year round. About half (47.5%) of the annual guests do some bicycling, with the most in the June – August period (30.8%) and the lowest level from December – February (15.8%). Only one-third of the B&Bs indicated that there were any cyclists riding December - February.

### **Bed & Breakfast Services**

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Half of the B&Bs had guests that arrived by bicycle. Most of those were Individuals/Couples/Families (3 of 5); the others were Groups/Bicycle clubs (2 of 5).

Maps were provided to visitors by two-thirds of the B&Bs. Most (5 of 6) gave verbal directions and one had written routes they had designed. One-third of the B&Bs had bicycles available for their customers and one-third of them charged for the rental of their bicycles. Most B&Bs (5 of 6) offered secure bicycle storage facilities.

### **Bed & Breakfast Ratings**

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Most owners (84%) rated bicycling as important to their area. Few owners rated the overall quality of bicycling in the area or of bicycle facilities as very good or excellent (0% for overall quality, 17% for facilities quality). All of the owners indicated that additional facilities should be built in the area and all owners favored the use of State and/or federal funds to build facility improvements.

The priorities for facility improvements were generally consistent with the intercept and visitor center surveys: bike paths, wider shoulders, bicycle lanes, bike stands to lock up bikes, multi-use paths, and wide curb lanes.





## **XII. APPENDIX F: PRIORITIES FOR BICYCLE FACILITY IMPROVEMENTS**

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The surveys asked respondents to list their priorities, in order of priority, for bicycle facility improvements. Respondents could list up to five priorities. The tables below show the results of the surveys of Intercepted Visitor Cyclists, Visitor Center Cyclists only, Visitor Center Respondents (including Non-cyclists), and Intercepted Resident Cyclists.

Two methods were used to determine the rankings. The first method simply listed the number of respondents that mentioned a particular improvement desired. The second method took into account the priority of the improvement listed. For example, if an item was listed as a Priority 1, it received a higher “weight” than an item listed as a Priority 5. (Priority 1 “votes” were multiplied by a weight of five, Priority 2 votes by a four, Priority 3 votes by a three, etc.) The second column below shows the weighted rankings. For the most part, the weighting did not change the relative order of the rankings.

Note: the rankings below are for each type of respondent. For example, the rankings by Intercepted Visitor Cyclists and Resident Cyclists cannot be directly compared with the rankings by the Visitor Center Respondents.

**Table 15. Intercepted Visitor Cyclists: ranked priorities selected for bicycle improvements in the area.**

<b>Intercept Priorities for Improvement</b>	<b>Unweighted Ranking</b>	<b>Weighted Ranking</b>	<b>Intercept Priorities for Improvement</b>	<b>Unweighted Ranking</b>	<b>Weighted Ranking</b>
Wider bike lanes	18	88	Park-setting paths	1	5
More bike paths	16	78	Path full length of beach road	1	5
Wider bike paths	12	53	Pavement from Jeannette's Pier to Oregon Inlet	1	5
Bike path only, no walkers	7	30	Safer paths	1	5
Crossing areas	7	27	Signs w/general trail miles	1	5
Signs alerting drivers of cyclist	5	21	Trails inland to shore	1	5
More bike lanes	4	20	Widen connector between Southern Shores and Duck	1	5
Extend paths north and sound	4	18	Widen lanes due to volume	1	5
Clear sand/rocks from shoulders	4	15	Better bike path to Corolla	1	4
Paved bike paths	3	15	Better pull out lanes for vehicles	1	4
Educate motorists "share the road"	3	13	Bike Lane on Bridge	1	4
Water stations	3	13	Bike path to neighborhoods	1	4
Bike racks	3	12	Bike paths to area	1	4
Bike route maps of area	3	11	Clean puddles	2	4
Bike shops	2	8	Definition of sidewalk use, it's not understood	1	4
Better markings	1	5	Landscaped and buffered paths	1	4
Better paths	1	5	Make law to stop for cyclists and pedestrians	1	4
Bike lane on Nat'l Seashore bike paths Rte. 12 South of Kitty Hawk	1	5	More lanes in the wooded areas	1	4
Bike paths to sound	1	5	More traffic control	1	4
Clean Glass from path	1	5	Multi-use paths	1	4
Complete Shoulders/Paths	1	5	Roads that connect by trails	1	4
Get asphalt overruns off concrete	1	5	Side street paths	1	4
Helmets provided	1	5	Vehicle courtesy	1	4
Link to Coquina Beach	1	5	Wider curbs around shore	1	4
More barriers on paths/sidewalks to separate from cars	1	5	Connect bike paths Nags Head to Duck	1	3
More bike paths along beach route	1	5	Increase line of sight for vehicles	1	3
Mountain Biking	1	5	Make paths more pretty	1	1
			Streets less busy	1	1
			<b>Total</b>	<b>136</b>	<b>599</b>

**Table 16. Visitor Center Cyclists: ranked priorities selected for bicycle improvements in the area.**

Visitor Center Cyclists Priorities for Improvement	Unweighted Ranking	Weighted Ranking
More bike paths	9	44
More bike lanes	3	12
Off road trails	2	9
Public restrooms	2	9
Wider bike lanes	2	9
More trails	2	8
Bike access to beaches	1	5
Bike only trails away from roads/traffic	1	5
Night time recreation/shopping	1	5
Rail to trail	1	5
Separate bike trails	1	5
Separate paths	1	5
Shoulders, not covered in sand	1	5
Asphalt route has too many root bumps	1	4
Better bikes at rental homes	1	4
More bike rental facilities	1	4
More multiuse paths	1	4
Water fountains	1	4
<b>Total</b>	<b>32</b>	<b>146</b>

**Table 17. Visitor Center Respondents (Cyclists and Non-cyclists): ranked priorities selected for bicycle improvements in the area.**

Visitor Center Priorities for Improvement, Cyclists and Non-cyclists	Unweighted Ranking	Weighted Ranking	Visitor Center Priorities for Improvement, Cyclists and Non-cyclists	Unweighted Ranking	Weighted Ranking
More bike paths	13	64	Shoulders, not covered in sand	1	5
More bike lanes	5	22	Asphalt route has too many root bumps	1	5
More trails	3	13	Public trolley system to ease traffic	1	5
More multiuse paths	3	13	Quieter shorefront path thru 12	1	5
Public restrooms	3	13	Wanchese	1	5
Wider bike lanes	4	12	Wider trails	1	5
Night time recreation/shopping	2	10	Better bikes at rental homes	1	4
Protected bike paths	2	10	More bike rental facilities	1	4
Off road trails	2	9	Water fountains	1	4
Bike access to beaches	1	8	More signage	1	4
Bike only trails away from roads/traffic	1	5	Shaded lunch spots	1	4
Rail to trail	1	5	Manteo	1	4
Separate bike trails	1	5	Separate parallel lane along 12	1	3
Separate paths	1	5			
			<b>Total</b>	<b>55</b>	<b>251</b>

**Table 18. Intercepted Resident Cyclists: ranked priorities selected for bicycle improvements in the area.**


<b>Resident Priorities for Improvement</b>	<b>Unweighted Ranking</b>	<b>Weighted Ranking</b>
More bike paths	5	22
Wider shoulders/curb lane	5	21
More paved shoulders	3	15
Wider path	3	15
Bike Route signs/map	4	13
Rumble stripes/strips/disks	4	12
Crosswalks	2	10
Benches/rest areas/fountains	2	9
Mid-Currituck Bridge	2	9
Better path thru Duck	1	5
Buffer from NC-12	1	5
Clean paths	1	5
Dedicated Bike Lane	1	5
Educate Motorists "Share the Road"	1	5
Level path/prevent flooding	1	5
Trails on 158/Beach Road	1	5
Bike lanes & multipurpose paths	1	4
Path on Beach Rd (Kitty Hawk)	1	4
Stop Speeders	1	4
Stops signs near paths	1	4
Better lighting along path	1	3
Bike/walk Right of Way	1	3
Connect existing disconnected paths	1	3
Keep trashcans out of path	1	3
Path in Southern Shores	1	3
Signs giving area info	1	3
Bike lane on bridges	1	2
Parking at malls/beaches	1	2
<b>Total</b>	<b>49</b>	<b>199</b>

### **XIII. APPENDIX G: SURVEY QUESTIONNAIRES**

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**Figure 34. Visitor Center Survey.** Both cyclists and non-cyclists were asked to fill it out in one of three visitor centers.



## Northern Outer Banks Tourist Survey

**Date:** \_\_\_\_\_

We are conducting a survey to collect information about visitors to this area—where they come from, what the purpose of their trip is, and what they do while here. We hope you will take a few minutes to help us.

*When you complete the survey, fold and put in the “ballot” box. Thanks!*

*This study is sponsored by the NC Department of Transportation,  
Division of Bicycle and Pedestrian Transportation.*

■ Where is your permanent residence (*i.e., where is home*)?

City/town: \_\_\_\_\_

State/Province: \_\_\_\_\_ ZIP: \_\_\_\_\_

Country: \_\_\_\_\_

■ What city(s)/town(s) did (will) you stay in or near while in this area?

\_\_\_\_\_

■ What is the main purpose of your trip to this area (the northern Outer Banks)? (*Check one*)

\_\_\_ Work/business

\_\_\_ Play (vacation/recreation)

\_\_\_ Other (Please specify): \_\_\_\_\_

■ How many people are in your travel party (including yourself)? \_\_\_ adults \_\_\_ children (*Under 18*)

■ What is the duration of your stay in this area (number of days)? \_\_\_\_\_

■ If this is an overnight trip, how many nights did (will) you use each of the following types of accommodations? (*Please write the number of nights in the space provided.*)

___ Not an overnight trip	___ Home of friends/family
___ Hotel/motel/resort	___ Bed and breakfast
___ Condo/time share	___ Hostel
___ Rental home	___ Campsite
___ Other (Please describe): _____	

■ Pick a typical day in your trip to this area. Approximately how much did (will) you spend that day on the following goods or services. *Please indicate if the amount you estimate represents your own individual expenditure, or the total for your family or group.*

		Individual	Family/Group
Accommodations:	\$ _____	___	___
Restaurant meals/fast food/bar:	\$ _____	___	___
Groceries/beverages/snacks:	\$ _____	___	___
Retail/shopping:	\$ _____	___	___
Recreation/entertainment:	\$ _____	___	___
Car/fuel:	\$ _____	___	___
Other (Please specify):	\$ _____	___	___
_____			

### Northern Outer Banks Tourist Survey

- What *recreational (daytime)* activities did/will you engage in during your stay here? (*Check all that apply*)

☐ None  
☐ Beach activities (swimming, sunning, etc.)  
☐ Fishing/boating/water skiing  
☐ Kayaking/canoeing  
☐ Hiking/walking  
☐ Golf  
☐ Bicycling  
☐ Shopping  
☐ Sightseeing/cultural attractions  
☐ Other (Please specify): \_\_\_\_\_

**If bicycling is one of the activities checked above, please complete the other side.**  
**(If not, you may stop here and return the survey. Thank you.)**

- How important was the activity of bicycling in your decision to come to this area?

Not Important    (*Circle the appropriate number*)    Very Important  
 1                      2                      3                      4                      5

- Did (will) the activity of bicycling make the duration of this trip longer (more days) than if biking wasn't involved?

☐ Yes    ☐ No    If yes, by how many days? \_\_\_\_\_

- Please rate yourself as a bicyclist:

☐ Beginner/Novice    ☐ Intermediate/Recreational    ☐ Advanced /Serious

- How many miles do you typically bike in a month?

☐ less than 10    ☐ 10-49    ☐ 50-99    ☐ 100-199    ☐ 200 or more

- Did you: ☐ bring a bike? ☐ rent a bike? ☐ use bikes available at lodging?

- How would you rate the overall quality of bicycling in the area?

Poor    (*Circle the appropriate number*)    Excellent  
 1                      2                      3                      4                      5

- How would you rate the overall quality of bicycling facilities in the area? *For the purposes of this survey, bicycle facility improvements include wide paved shoulders (4 feet or wider), wide curb lanes (outside travel lane of 13-14 feet allowing space for bicycles and cars to operate safely in the same lane of travel), bike paths and multi-use paths (paved, off-road facilities used by bicyclists and pedestrians).*

Poor    (*Circle the appropriate number*)    Excellent  
 1                      2                      3                      4                      5

- To what extent did the existence of these bicycling facilities help you to feel safer while biking?

Not a Factor    (*Circle the appropriate number*)    A Great Deal  
 1                      2                      3                      4                      5

### Northern Outer Banks Tourist Survey

- How important will the quality of bicycling be in a decision for you to return to this area at a later date?

Not a Factor    *(Circle the appropriate number)*    A Great Deal  
1                      2                      3                      4                      5

- Do you think additional bicycle facilities should be built in the area?    \_\_\_ Yes    \_\_\_ No    \_\_\_ Don't know.

- If yes, please list, in order of priority, the type of facility improvements you would most like to see:

Priority 1: \_\_\_\_\_                      Priority 4: \_\_\_\_\_  
Priority 2: \_\_\_\_\_                      Priority 5: \_\_\_\_\_  
Priority 3: \_\_\_\_\_

- Do you favor the use of State and/or federal funds to build such facilities?    \_\_\_ Yes    \_\_\_ No

### The information below is optional, but helpful.

- Age: \_\_\_\_\_                      Gender: \_\_\_\_\_ Male \_\_\_\_\_ Female

- Household income:

\_\_\_\_\_ less than \$15,000    \_\_\_\_\_ \$15,000-\$24,999    \_\_\_\_\_ \$25,000-\$34,999    \_\_\_\_\_ \$35,000-\$49,999  
\_\_\_\_\_ \$50,000-\$74,999    \_\_\_\_\_ \$75,000-\$99,999    \_\_\_\_\_ \$100,000 or more

- Education level:

\_\_\_\_\_ Did not complete high school                      \_\_\_\_\_ Some college  
\_\_\_\_\_ Completed high school                      \_\_\_\_\_ Completed college  
\_\_\_\_\_ Business/technical school                      \_\_\_\_\_ Advanced degree

**Thank you very much for your help!**  
**Please return survey in the postage paid envelope provided.**



**Figure 35. Intercepted Visitor Cyclist Survey.** Cyclists visiting the area were stopped at various bicycle facility locations and asked to fill out the survey.



### Bicycling the Northern Outer Banks: Survey of Cycling Visitors

Date: \_\_\_\_\_

Today we are conducting a survey to collect information about bicycling in the area. We hope you will take a few minutes to help us learn more about general bicycling in the area, who you are and why you bicycle here, your use of the bicycle facilities in the area, your economic impact on the area, and your opinions about existing and future bicycle facility improvements.

**For the purposes of this survey, bicycle facility improvements include wide paved shoulders (4 feet or wider), wide curb lanes (outside travel lane of 13-14 feet allowing space for bicycles and cars to operate safely in the same lane of travel), bike paths and multi-use paths (paved, off-road facilities used by bicyclists and pedestrians).**

*This study is sponsored by the NC Department of Transportation, Division of Bicycle and Pedestrian Transportation.*

- Where is your permanent residence (*i.e., where is home*)?  
 City/town: \_\_\_\_\_  
 State/Province: \_\_\_\_\_ ZIP: \_\_\_\_\_  
 Country: \_\_\_\_\_
- Please describe your travel party: \_\_\_ individual; \_\_\_ couple; \_\_\_ single family; \_\_\_ multiple families; \_\_\_ group of friends; \_\_\_ bike club; \_\_\_ other (Please describe): \_\_\_\_\_
- If you are not traveling as an individual, how many people are in your travel party (*including yourself*)?  
 \_\_\_\_\_ adults \_\_\_\_\_ children (under 18)
- If your trip to this area (the northern Outer Banks) was (is) overnight, how many nights did (will) you use each of the following types of accommodations? (*Please write the number of nights in the space provided.*)  
 \_\_\_\_\_ This was not an overnight trip  
 \_\_\_\_\_ Hotel/motel/resort \_\_\_\_\_ Bed and breakfast  
 \_\_\_\_\_ Condo/time share \_\_\_\_\_ Hostel  
 \_\_\_\_\_ Rental home \_\_\_\_\_ Home of friends/family  
 \_\_\_\_\_ Campsite  
 \_\_\_\_\_ Other (Please describe): \_\_\_\_\_
- What city(s)/town(s) did (will) you stay in or near while in this area?  
 \_\_\_\_\_
- What is the main purpose of your trip to this area? (*Please check one*)  
 \_\_\_\_\_ Work/business  
 \_\_\_\_\_ Vacation/visiting/play
- In addition to bicycling, please indicate below any other recreational activities you engaged (will engage) in:  
 \_\_\_\_\_ Beach activities (swimming, sunning, etc.) \_\_\_\_\_ Shopping  
 \_\_\_\_\_ Kayaking/canoeing \_\_\_\_\_ Fishing/boating/water skiing  
 \_\_\_\_\_ Hiking/walking \_\_\_\_\_ Sightseeing/cultural attractions  
 \_\_\_\_\_ Golf  
 \_\_\_\_\_ Other (Please specify): \_\_\_\_\_
- What is the duration of your trip in this area? \_\_\_\_\_ days On how many of these days did (will) you bike? \_\_\_\_\_
- How many similar trips have you made to this area in the last 12 months? \_\_\_\_\_

### Bicycling the Northern Outer Banks: Survey of Cycling Visitors

- In what months did these trips take place? *(Circle all that apply)*
- Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
- How many similar trips have you made to other areas in the last 12 months? \_\_\_\_\_
- How many similar trips do you plan to make to this area in the next 12 months? \_\_\_\_\_ In what months? *(Circle all that apply)*
- Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
- Please rate yourself as a bicyclist:
- \_\_\_\_\_ Beginner/Novice \_\_\_\_\_ Intermediate/Recreational \_\_\_\_\_ Advanced /Serious
- How many miles do you typically bike in a month?
- \_\_\_\_\_ less than 10 \_\_\_\_\_ 10-49 \_\_\_\_\_ 50-99 \_\_\_\_\_ 100-199 \_\_\_\_\_ 200 or more
- Did you: \_\_\_\_\_ bring your bike? \_\_\_\_\_ rent your bike? \_\_\_\_\_ use bikes available at lodging?
- How important was the activity of bicycling in your decision to come to this area?
- Not Important *(Circle the appropriate number)* Very Important
- 1 2 3 4 5
- Did (will) the activity of biking make the duration of this trip longer (more days) than if biking wasn't involved?
- \_\_\_\_\_ Yes \_\_\_\_\_ No If yes, by how many days? \_\_\_\_\_
- Please briefly describe your bike trip today:
- Starting Point \_\_\_\_\_ Destination \_\_\_\_\_
- Describe the route you are following (including, where possible, the approximate number of one-way miles, and what bicycle facilities were/will be used):
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- How would you rate the overall quality of bicycling in the area?
- Poor *(Circle the appropriate number)* Excellent
- 1 2 3 4 5
- How would you rate the overall quality of bicycle facilities in the area? *(Bicycle facilities are paved shoulders, wide curb lanes, bike paths, and multi-use paths.)*
- Poor *(Circle the appropriate number)* Excellent
- 1 2 3 4 5
- To what extent did the existence of these bicycle facilities help you to feel safer while biking?
- Not a Factor *(Circle the appropriate number)* A Great Deal
- 1 2 3 4 5
- How important will the quality of bicycling be in a decision for you to return to this area at a later date?
- Not a Factor *(Circle the appropriate number)* A Great Deal
- 1 2 3 4 5

### Bicycling the Northern Outer Banks: Survey of Cycling Visitors

- Pick a typical day in your trip to this area. Approximately how much did (will) you spend that day on the following goods or services. *Please indicate if the amount you estimate represents your own individual expenditure, or the total for your family or group.*

		Individual	Family/Group
Accommodations:	\$ _____	_____	_____
Restaurant meals/fast food/bar:	\$ _____	_____	_____
Groceries/beverages/snacks:	\$ _____	_____	_____
Retail/shopping:	\$ _____	_____	_____
Recreation/entertainment:	\$ _____	_____	_____
Bicycle "stuff" (rental, equip., etc.)	\$ _____	_____	_____
Car/fuel:	\$ _____	_____	_____
Other: Please specify: _____	\$ _____	_____	_____

- Do you think additional bicycle facilities should be built in the area? \_\_\_ Yes \_\_\_ No \_\_\_ Don't know.
- If yes, please list, in order of priority, the type of bicycle facility improvements you would most like to see:  
 Priority 1: \_\_\_\_\_ Priority 4: \_\_\_\_\_  
 Priority 2: \_\_\_\_\_ Priority 5: \_\_\_\_\_  
 Priority 3: \_\_\_\_\_

- Do you favor the use of State, and/or federal funds to build such facilities? \_\_\_ Yes \_\_\_ No

- Do you have any other comments about bicycling, or bicycle facilities, in this area?

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### The information below is optional, but helpful.

- Age: \_\_\_\_\_ Gender: \_\_\_ Male \_\_\_ Female
- Household income:  
 \_\_\_ less than \$15,000 \_\_\_ \$15,000-\$24,999 \_\_\_ \$25,000-\$34,999 \_\_\_ \$35,000-\$49,999  
 \_\_\_ \$50,000-\$74,999 \_\_\_ \$75,000-\$99,999 \_\_\_ \$100,000 or more
- Education level:  
 \_\_\_ Did not complete high school \_\_\_ Some college  
 \_\_\_ Completed high school \_\_\_ Completed college  
 \_\_\_ Business/technical school \_\_\_ Advanced degree

Thank you very much for taking the time to fill out this survey!

**Figure 36. Intercepted Resident Survey.** Cyclists (residential only) at various bicycle facility locations were stopped and asked to fill out this survey.



**Bicycling the Northern Outer Banks:  
Survey of Local Residents**

**Date:** \_\_\_\_\_

Today we are conducting a survey to help us determine the impact of bicycling on local areas. The survey is designed to help us find out more about local bicyclists—where they come from, what the major reason for their bike trip is, and how often they make such trips. This information will help us to better understand the various types of users of bicycling “facilities”, as well as what they think about them. We hope you will take a few minutes to help us.

**For the purposes of this survey, bicycle facility improvements include wide paved shoulders (4 feet or wider), wide curb lanes (outside travel lane of 13-14 feet allowing space for bicycles and cars to operate safely in the same lane of travel), bike paths and multi-use paths (paved, off-road facilities used by bicyclists and pedestrians).**

*This study is sponsored by the NC Department of Transportation, Division of Bicycle and Pedestrian Transportation.*

■ Are you a permanent or part-time resident of this county?

☐ Permanent  
☐ Part-time (for example, you mainly live somewhere else but have a 2nd home here)

■ If part-time, where is your permanent residence (i.e., where is home)?

City/town: \_\_\_\_\_  
 State/Province: \_\_\_\_\_ ZIP: \_\_\_\_\_  
 Country: \_\_\_\_\_

■ What is the main purpose of your bicycle trip? *(Check one)*

☐ Recreation                      ☐ Commuting (to work, school)  
☐ Personal errands                      ☐ Exercise  
☐ Visit a friend/relative                      ☐ Other (Please specify): \_\_\_\_\_

■ How often do you make a bicycle trip like this?

☐ Less than once/week   ☐ 1-2 days/week   ☐ 3-5 days/week   ☐ 6-7 days/week

■ Please briefly describe your bike trip today:

Starting Point \_\_\_\_\_ Destination \_\_\_\_\_

■ Describe the route you are following (including, where possible, the approximate number of one-way miles, and what bicycling facilities, as described above, were/will be used):

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

■ Please rate yourself as a bicyclist:

☐ Beginner/Novice   ☐ Intermediate/Recreational   ☐ Advanced /Serious

■ How many miles do you typically bike in a month?

☐ less than 10   ☐ 10-49   ☐ 50-99   ☐ 100-199   ☐ more than 200

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**Bicycling the Northern Outer Banks: Survey of Local Residents**

- How would you rate the overall quality of bicycling in the area?  

Poor    *(Circle the appropriate number)*    Excellent  
 1       2       3       4       5
- How would you rate the overall quality of bicycle facilities in the area? *(Bicycle facilities are paved shoulders, wide curb lanes, bike paths, and multi-use paths.)*  

Poor    *(Circle the appropriate number)*    Excellent  
 1       2       3       4       5
- To what extent did the existence of these bicycle facilities help you to feel safer while biking?  

Not a Factor    *(Circle the appropriate number)*    A Great Deal  
 1       2       3       4       5
- Do you think additional bicycle facilities should be built in the area?    ☐ Yes    ☐ No    ☐ Don't know.
- If yes, please list, in order of priority, the type of bicycle facility improvements you would most like to see:  

Priority 1: \_\_\_\_\_  
 Priority 2: \_\_\_\_\_  
 Priority 3: \_\_\_\_\_

Priority 4: \_\_\_\_\_  
 Priority 5: \_\_\_\_\_
- Where should they be located?  
 \_\_\_\_\_  
 \_\_\_\_\_
- Do you favor the use of State and/or federal funds to build such facilities?    ☐ Yes    ☐ No
- The information below is optional, but helpful.  

Age: \_\_\_\_\_                      Gender:    ☐ Male    ☐ Female
- Household income:  

\_\_\_\_\_ less than \$15,000
\_\_\_\_\_ \$15,000-\$24,999
\_\_\_\_\_ \$25,000-\$34,999
\_\_\_\_\_ \$35,000-\$49,999

\_\_\_\_\_ \$50,000-\$74,999
\_\_\_\_\_ \$75,000-\$99,999
\_\_\_\_\_ \$100,000 or more
- Education level:  

\_\_\_\_\_ Did not complete high school
\_\_\_\_\_ Some college

\_\_\_\_\_ Completed high school
\_\_\_\_\_ Completed college

\_\_\_\_\_ Business/technical school
\_\_\_\_\_ Advanced degree

**Thank you very much for taking the time to fill out this survey!**

**Figure 37. Bed and Breakfast/Campground Establishment Survey.** Used for owners/managers who provide lodging in the area.



## Bicycling the Northern Outer Banks: Lodging/Campground Survey

Date: \_\_\_\_\_

The purpose of this survey is to help us determine the impact of bicycling on local areas, especially in regard to tourists who bicycle during their visit. One such impact is on the "lodging" industry. We would therefore appreciate your taking a few minutes to answer the following questions.

**For the purposes of this survey, bicycle facilities include wide paved shoulders (4 feet or wider), wide curb lanes (outside travel lane of 13-14 feet allowing space for bicycles and cars to operate safely in the same lane of travel), bike paths and multi-use paths (paved, off-road facilities used by bicyclists and pedestrians).**

*This study is sponsored by the NC Department of Transportation, Division of Bicycle and Pedestrian Transportation.*

- About how many visitors/guests stay at your establishment in an average year? \_\_\_\_\_
- What months are you open during the year? \_\_\_\_\_
- Approximately what percentage of your total visitors/guests are "bicyclists" (i.e., they do some bicycling while on their trip)?
 

Yearly _____%	Dec-Feb _____%	Mar-May _____%
	Jun-Aug _____%	Sep-Dec _____%
- Do you have any visitors/guests that arrive by bicycle? \_\_ Yes \_\_ No If yes, are they:
  - \_\_\_ Individuals/couples/families
  - \_\_\_ Groups/bicycle clubs
  - \_\_\_ Commercial bike tours
  - \_\_\_ Other (Please specify): \_\_\_\_\_
- Do you provide bicycling information to your visitors if requested?
  - Maps: \_\_ Yes \_\_ No
  - Verbal directions: \_\_ Yes \_\_ No
  - Other: \_\_ Yes \_\_ No (Please specify): \_\_\_\_\_
- Do you have any bicycles available for your customers? \_\_ Yes \_\_ No
- Are they free or rental? \_\_ Free \_\_ Rental
- Do you offer secure bicycle storage facilities? \_\_ Yes \_\_ No
- How important do you consider bicycling to be in this coastal area?
 

Not Important	(Circle the appropriate number)					Very Important
1	2	3	4	5		
- How would you rate the overall quality of bicycling in the area?
 

Poor	(Circle the appropriate number)					Excellent
1	2	3	4	5		

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**Bicycling the Northern Outer Banks: Lodging/Campground Survey**

- How would you rate the overall quality of bicycle facilities in the area? *(Bicycle facilities are paved shoulders, wide curb lanes, bike paths, and multi-use paths.)*

Poor (Circle the appropriate number) Excellent  
1 2 3 4 5

- Do you think additional bicycle facilities should be built in the area? \_\_\_ Yes \_\_\_ No \_\_\_ Don't know.

If yes, please list, in order of priority, the type of facility improvements you would most like to see:

Priority 1: \_\_\_\_\_  
Priority 2: \_\_\_\_\_  
Priority 3: \_\_\_\_\_  
Priority 4: \_\_\_\_\_  
Priority 5: \_\_\_\_\_

- Do you favor the use of State and/or federal funds to build such facilities? \_\_\_ Yes \_\_\_ No

- Do you have any other comments about area bicycling, or bicycle facilities?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name of establishment: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
City/town: \_\_\_\_\_  
State: \_\_\_\_\_ ZIP: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Contact name: \_\_\_\_\_